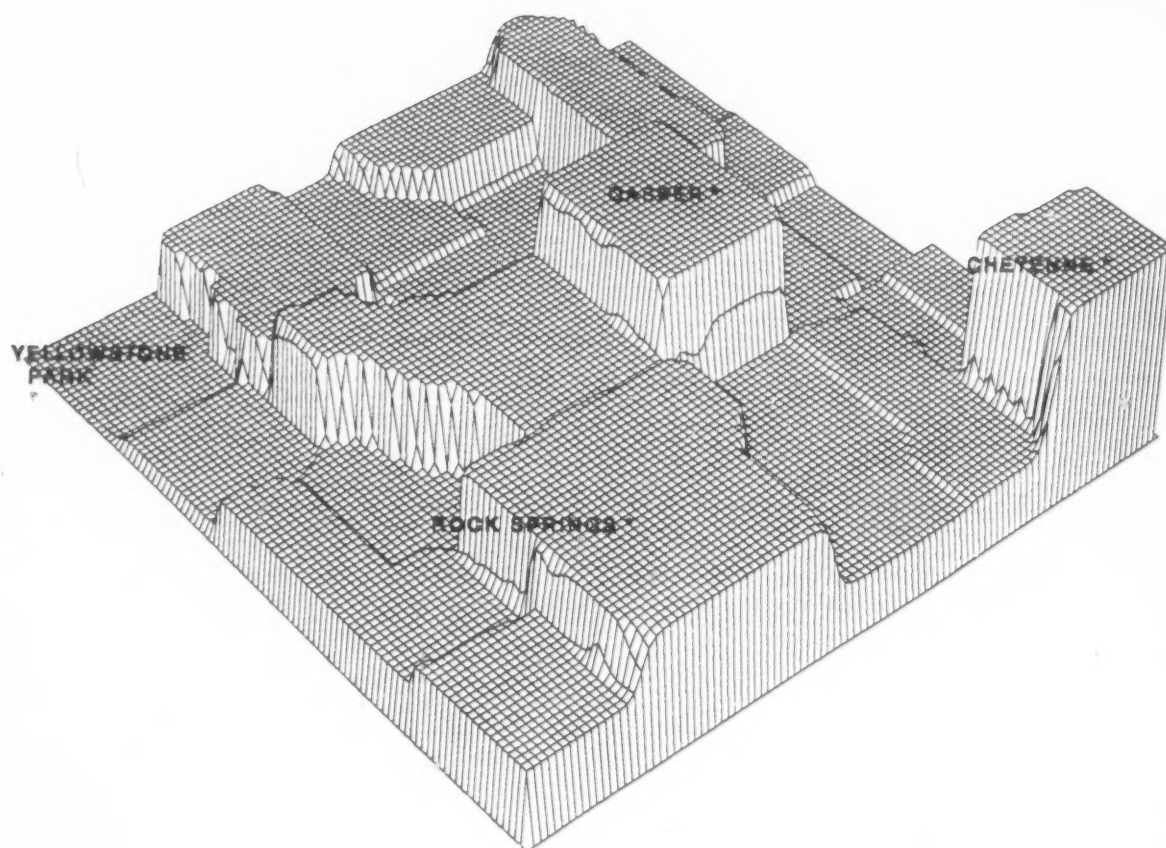


WYOMING QUARTERLY UPDATE

FALL 1989

Vol. 9, No.1

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SRC

 SURVEY
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FALL ENROLLMENT IN WYOMING SCHOOLS, 1989

SURVEY RESEARCH CENTER
DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF WYOMING

Wyoming Quarterly Update

Wyoming Quarterly Update (WQU) represents the efforts of the Survey Research Center at the University of Wyoming to provide improved data access services. The data presented in WQU are assembled from secondary sources, such as government agencies and private industry. The staff of SRC greatly appreciates the ongoing, helpful cooperation of each of the data sources.

WQU provides current indicators and timely, easily accessible data. Most of the data published in WQU are updated quarterly with the most current numbers. The complete data sets from which WQU originates are maintained, together with documentation by SRC. Readers are encouraged to contact the Center to find out how to gain access to data which do not appear in the WQU. Many data series, such as gasoline sales and taxation data, span more than 30 years. Numerous other series cover 20 years or more.

The cover of each edition features a contour map illustrating the geographic distribution of a particular variable. This edition presents the number of elementary and secondary students enrolled in each county as of the Fall term 1989. Statistics were obtained from the Wyoming State Department of Education. See below for Data used in the map. For your information data is also provided on the number of teachers in each county. A more in-depth look at education in Wyoming is available in the Feature Article section of this edition.

County	Teachers	Students	County	Teachers	Students	County	Teachers	Students
Albany	309	4117	Hot Springs	82	976	Sheridan	276.5	4608
Big Horn	216	2492	Johnson	105	1250	Sublette	110	1226
Campbell	429.5	7580	Laramie	767	14196	Sweetwater	598	9503
Carbon	295.5	3756	Lincoln	247	3550	Teton	119	820
Converse	186	2696	Natrona	793	12565	Uinta	311	5362
Crook	107	1185	Niobrara	48	500	Washakie	143	1925
Fremont	593	7454	Park	279	4623	Weston	132	1513
Goshen	192	2398	Platte	153	1891	Yellowstone	0	0

First-time readers of WQU should refer to the "format" explanations on page 46 for keys on how best to use and interpret data presented in this publication.

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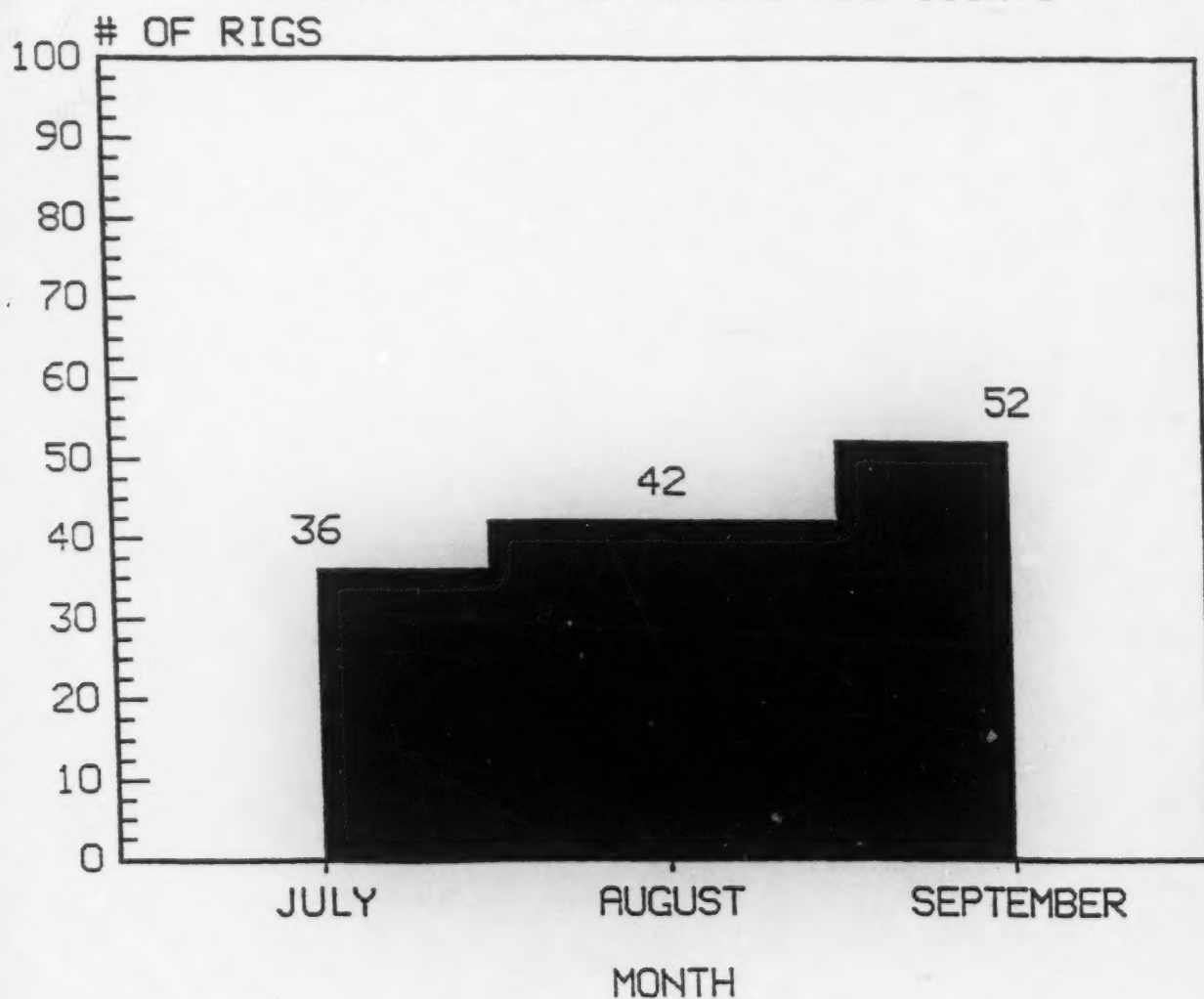
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The articles appearing in this publication represent the opinions of the authors and do not necessarily reflect the views of the State of Wyoming or the University of Wyoming or their respective executive officers. Duplication or quotation of material in this publication is welcomed, but it is requested that WQU, the Survey Research Center, University of Wyoming, be credited.

Wyoming Scene

MONTHLY AVERAGE ACTIVE RIG COUNTS



Overview and Perspective

Two prevalent news items, which dominated newspapers during the 3rd quarter, concerned the final land and resource management plan for Bridger-Teton National Forest and the proposed pipeline from Opal to California, both of which will have an effect on Wyoming's economy.

The final land and resource management plan for Bridger-Teton National Forest is finally being distributed after more than 10 years of work. In a nutshell (the report is 200 pages long, accompanied by a 1600 page environmental impact statement) the plan calls for nearly a 30% decrease in saw timber cut annually over the next 10 years, and maintaining or slightly increasing recreational use of the forest. The amount of land for mineral leasing is decreasing slightly but mineral related activities will see a 46% increase in the budget over a 10 year period. Around 1.5 million acres is off limits to oil and gas leasing due to its congressional designation as wilderness. However, 96% of the remaining acreage (about 1.9 million acres) will be available for oil and gas leasing with restrictive stipulations attached.

Recreation seems to have received the top billing according to forest planners with more of an emphasis on wildlife and recreation than most commodities. The plan is setting the stage for a battle between conservationists and the mining industry. Bill Schilling of the Wyoming Heritage Society stated, "The Forest Service is looking at it with a preference to wildlife and ecology values and to discount the economic values associated with the mineral industry in the state, which provides 65 percent of the state's revenue." At the same time the Northern Plains representative for the Sierra Club, Larry Mehlhoff, commenting on the remaining amount of land available for oil and gas leasing claimed, "I think you can rest assured that the Sierra Club will not allow them to lease 95 percent of the land on the forest without a battle." Though the curtain has fallen on Act I it is fairly safe to say this play is far from over.

The proposed natural gas pipeline from Wyoming to California was also a hot issue during the 3rd quarter. The pipeline could prove to be a shot in the arm to Wyoming's economy. In fact, officials for the Petroleum Information Corporation, offer speculation that an increasing number of oil and gas rigs could be an indication that gas producers are building up reserves in anticipation of either Wycal or Kern River going through with the pipeline. Responses to a Wyoming Heritage Foundation Poll conducted in August indicate Wyoming residents favor the proposed pipeline. Respondents were asked their opinion on a \$250 million loan to finance construction of the pipeline and guarantee the use of Wyoming gas in the line. Sixty-five percent either strongly supported or somewhat supported the idea.

The upward trend in the number of new corporations reported in the last issue did not continue. Only 432 new corporate charters were applied for during the 3rd quarter of 1989. This compares with 454 for the same time period last year and 551 last quarter. However, the number of business failures continues to decline. During the 3rd quarter 24 such failures were reported, the lowest amount since the 4th quarter of 1980. This optimism is echoed in the construction industry where the number of residential dwelling units, the value of residential and nonresidential units, the number of building permits, and the value of authorized construction were all up from the same time period in 1988.

The beginning of the 3rd quarter marks the ending of the summer tourist season. It is interesting to note that visitations to Yellowstone, Grand Tetons, Devil's Tower and the southern portion of the Bighorns were all up from the 3rd quarter last year. However, Fossil Butte and Fort Laramie each reported a decline in visitations for the same time period.

It should be interesting to see what effect, if any, the pipeline and other possible industries moving into Wyoming (mentioned in the Minerals Update) might have on Wyoming's unemployment rate. In June Wyoming ranked 11th highest in unadjusted unemployment at 5.5%. By July this rose to 7th highest with an unadjusted unemployment of 6.1%. Within Wyoming Teton County came out the big winner with the lowest unemployment rate for all three months of the 3rd quarter (July, August, September). Honors for the highest unemployment rate were not as consistent with Sweetwater and Lincoln Counties topping the list in July; Fremont and Sweetwater in August; and Uinta, Campbell, and Fremont in September. The Wyoming Employment Security Commission points out that since 1982 statewide employment has dropped 15 percent while Teton County has grown by 55 percent.

Preview of Coming Attractions

--The Federal Emergency Management Agency (FEMA) has awarded \$686,000 in funds for a proposal submitted by Western Wyoming College in Rock Springs for a Survival Crisis Management Project.

--The U.S. Bureau of Land Management is considering a proposal that would enable companies to obtain coal leases faster than the 3 years it now takes. The process, termed "decertification, would take approximately 1 year. Powder River coal project manager with the BLM, Don Bratison, stated, "We are not looking to encourage leasing interests. We're looking to be responsive to the limited leasing interest that we're now aware of."

--The reintroduction of wolves may be debated in Congress this fall. Support is growing for Representative Wayne Owen's bill which calls for an environmental impact statement on reintroduction to be prepared. A second bill sponsored by Senator James McClure, R-Idaho, involves the placement of breeding pairs into Yellowstone and Central Idaho. This bill is gaining tentative support from one time opponents of wolf reintroduction because it stipulates the wolves would no longer be protected under the Endangered Species Act and the National Environmental Policy Act should they leave protected areas. As Senator Al Simpson said, "Livestock growers must have the right to kill the wolf if it gets out of the protected area and apparently, people are ready to talk on that basis. If so I am ready to talk too."

--The north border of Yellowstone National Park is home to a new gold mine. The company expects to remove \$108 million in gold from the mine. Company official, Dick Agar, says the mine will not harm wildlife or the environment and the recovery should take about 8 years.

--By November Wyoming may have a foreign trade zone at the Natrona County International Airport. The federal government approved Natrona County's trade zone in January and now the paperwork, security, and inventory systems need to be inspected by U.S. Customs Service. If all proceeds as planned the project may create as many as 40 new jobs in the next 2 years.

Terry's Trivia

During the last 12 quarters (from 4th quarter 1986 to 3rd quarter 1989) there has been only 2 quarters where more cars than trucks were sold in Wyoming.

Terry Haven
Editor
Survey Research Center
University of Wyoming

Correction

Part of the conclusion to Wendy Curren's article in the last Update was inadvertently misplaced in the text. The Conclusion to "The Effects of Malpractice in Wyoming and Possible Solutions" should read:

Thoughtful, balanced consideration of the Most effective tort reform measures may provide some answers to Wyoming's health care needs by making liability exposures more predictable and liability insurance more affordable. Leveling the playing field can result, as it has in a growing number of other states in lower premiums for Wyoming doctors and continued high quality medical care for Wyoming's residents.

FYI

WYOMING COMPARATIVE COST OF LIVING INDEX PRICES AS OF JULY 12, 13, AND 14, 1989 STATEWIDE AVERAGE = 100 TABLE I

CITY	RANK	ALL ITEMS	FOOD	HOUSING	MEDICAL
JACKSON	1	115.6	109.3	130.1	95.3
GILLETTE	2	105.6	103.8	110.9	109.6
CHEYENNE	3	105.2	99.0	112.9	102.1
LARAMIE	4	103.2	103.3	106.1	99.5
ROCK SPRINGS	5	101.8	95.3	106.8	91.6
SHERIDAN	6	99.8	103.0	94.8	105.5
NEWCASTLE	7	98.3	101.3	92.4	99.2
EVANSTON	8	98.1	97.8	94.3	105.9
CODY	9	97.9	103.4	97.6	88.1
CASPER	10	97.8	103.7	93.7	105.8
DOUGLAS	11	97.5	97.2	96.3	99.6
KEMMERER	12	96.7	94.8	94.6	101.0
RAWLINS	13	95.8	97.4	92.9	100.8
WORLAND	14	93.3	91.8	90.2	96.7
RIVERTON	15	93.3	98.8	86.3	99.4
LAKEWOOD CO.		116.3	98.2	133.4	112.3

SOURCE: Biannual Wyoming Cost of Living Report, June 1989, Research and Statistics Division, Department of Administration and Fiscal Control.

Fall Minerals Update

OVERVIEW

With half a year's production already available, it is fairly safe to predict that Wyoming will remain Number One in coal production again in 1989. Production in 1989 should be very close to 170 million tons, or more than a six million ton increase over the record 163.6 million tons mined in 1988. Looking farther into the future, annual production should be close to 200 million tons by 1995 (Table 1).

While these production increases bode well for employment stability and payrolls in the coal mining industry, they have a downside in regard to State and county revenues. Because all these forecast increases in production are related to new contracts or spot sales, the prices received for these sales have all been well below \$4.00 per ton. Even renegotiated contracts are coming in at similar prices. The tonnage increases, though substantial, are not enough to offset the effect of the lower prices, at least through the middle of the next decade. The bottom line is that as coal production increases in the Powder River Basin, the lower prices received for this coal will decrease the average assessed value per ton; thereby decreasing revenues from severance and ad valorem taxes as well as from royalty payments.

Increases in coal prices seem unlikely before the late 1990s because of the excess production capacity in the Powder River Basin. By the late 1990s, however, the surplus coal-producing capacity should be gone or waning. Coal prices could possibly rise sooner than the late 1990s if production increases substantially more than we have predicted or if oil and gas prices increase significantly. While the former is a real possibility, the latter seems unlikely.

Natural gas production is also increasing each year now as the "gas bubble" of the past several years disappears (Table 1). Increased demand for gas is opening heretofore shut-in wells more and more frequently each year. While there was a time not long ago that many smaller gas producers in the Powder River Basin were seeking permission to flare unwanted gas, that is no longer the case. In fact, there is enough demand that several large coalbed methane projects are coming on line and finding a ready market for their new production. Companies drilling new gas wells in the Green River Basin of southwestern Wyoming are not only betting on a new pipeline to California, but also on other new markets to include the Midwest.

Here again, like coal, the only downside is the sale price for much of the gas. Many forecasters predicted significant increases in gas prices with both deregulation (which is now a fact) and with the bursting of the "gas bubble". Significant price increases, however, have not occurred yet. In part, this may be the result of the "gas bubble" only leaking slowly rather than bursting quickly. It does look like natural gas prices bottomed out in 1988 and 1989 and therefore will continue to increase yearly. This will help the gas industry and should stimulate even more drilling.

Before discussing some positive signs in the trona and uranium industries, something needs to be said about oil production. Production did decline between 1987 and 1988, but not as much as some anticipated (Table 1). The slowing of the decline is attributed to some rather large tertiary recovery operations, which came on line. Unfortunately the decline of the older larger fields will very likely overcome incremental increases from tertiary projects in 1989 and beyond, and production will begin to decline at about five percent or more per year.

Oil prices are another matter and one of some relief. The price for Wyoming oil has stayed above \$17.25 for the last seven months. While prices have not been up there long enough or high enough to stimulate an increase in exploration, these prices are a far cry above the disastrously low prices of last year.

As mentioned earlier, there is optimism for trona as two soda ash companies had announced expansion plans by the end of the third quarter. Soda ash production is running at or near capacity in all five plants and production is forecast to increase in 1990 and again in 1993. Although uranium prices have fallen, existing uranium solution mines are proceeding to expand their production also, and several newcomers are still moving forward with their plans for new solution mines.

In regard to other mineral activities in the third quarter, there is still keen interest in opening a glass plant in the State and making that glass from raw materials all derived from Wyoming. Some interest in garnet and mica deposits has surfaced, and gold placer mining is increasing along with exploration for several other metals.

Overall the third quarter has brightened the prospects for increased production of mineral and energy resources with the exception of oil. In the case of oil, however, the higher and more stable price is a good sign that was hard to reliably predict.

Gary B. Glass
State Geologist and Director
Geological Survey of Wyoming

OIL AND GAS UPDATE

Several signs indicate renewed vigor in Wyoming's gas industry. Final figures from the Wyoming Oil and Gas Conservation Commission show that 811.6 billion cubic feet of gas were produced in 1988, an increase of 10.7 percent over 1987 production. Table 1 gives a breakdown of that production, i.e. methane versus carbon dioxide gases.

The average monthly rig count, which was stagnant for the first four months of 1989, is now rising at a rapid rate. September's average was the highest since December, 1987. Most of the increase in the count are related to more gas wells being drilled. Forecasters are predicting an end to the gas deliverability surplus (gas bubble) this winter and some predict a gas deliverability crisis in the near future. Even though posted crude oil prices have been between \$17.25 and \$19.50 for the last seven months, prices have not remained stable long enough to stimulate increased rates of oil drilling.

In addition to the infill drilling announced earlier this year by Union Pacific Resources and Enron Oil and Gas, WEXPRO has completed several new gas wells and has five rigs under contract for an extensive gas development program in the Church Buttes Field area. It's no coincidence that these three projects are all in southwestern Wyoming. All three are betting at least in part on an Opal to California pipeline.

In regard to the Opal to California pipeline, both WyCal and Kern River signed more transportation commitments. WyCal has even bought 450 miles of large-diameter pipe. Kern River Transmission Co. reached an agreement with Southern California Gas Co. and with Mojave Pipeline Co. that ended a four-year dispute. Under terms of the agreement, Kern River would build their line from Opal, Wyoming and Mojave would build their line from Topock, Arizona. The lines would merge near Barstow, California and continue as a single line for another 200 miles to Kern County's oil fields. Kern River reached an earlier agreement with Altamont, a Canadian consortium, that paves the way for transporting Canadian gas from Wildhorse, Alberta, Canada to Opal, Wyoming on a pipeline that would merge with Kern River's pipeline.

Another good sign for Wyoming gas producers concerns the Trailblazer Pipeline. Although Trailblazer was built to move gas from the Overthrust Belt to the Midwest, in recent months it has only moved about 150 million cubic feet of gas per day. Trailblazer's capacity is 350 million cubic feet of gas per day. A new proposal would cut shipping charges on Trailblazer by at least half. Regulatory approval of the proposal might mean that an additional 200 million cubic feet per day of Overthrust Belt gas would move to the Midwest.

President Bush recently signed a gas price decontrol bill. The law removes controls on the remaining natural gas that is subject to price ceilings. Controls will end by January of 1993 for existing wells and by May of 1991 for wells drilled after the bill was signed. Although short term effects of the bill will probably not be dramatic, price increases for Wyoming producers should be realized as gas supplies dwindle.

Uinta County is a potential site for a very large ethylene and ethylene-derivative plant in the mid-1990s according to a study conducted for Uinta County by Chem Systems Inc. An ethylene plant could use natural gas liquids from eight gas processing plants already located in the County. According to a spokesman for Chem Systems, a plant in production by 1995 would provide employment for about 520 people, would yield projected revenue estimated at \$400 million, and could produce one billion pounds of chemicals per year.

Many of the higher bids at the last two oil and gas lease sales held by the Wyoming State Land and Farm Loan Office and the last sale held by the U.S. Bureau of Land Management (BLM) were for leases in the predominantly gas-producing Green River Basin. These and other lease sales in the State did well during the third quarter of this year. The high per-acre bid at the August BLM sale was \$285 by High Plains Energy for a 280-acre lease in section 29, T.23N., R.110W. The tract is nearly four miles south of shut-in Dakota and Frontier production at Four Mile Gulch Field. Celsius Energy and Union Pacific Resources bid \$294,000 (\$115 per acre) for a 2,560-acre lease which included sections 22, 23, 24, and 25, T.15N., R.95W. The tract is five miles northwest of Dripping Rock Field. Dripping Rock Field has produced over 7.5 billion cubic feet of gas from the Almond and Lewis since it was discovered late in 1984.

The high bid at the Wyoming State Land and Farm Loan Office's July sale was \$190 per acre by Exxon Corp. for a 640-acre lease covering section 36, T.23N., R.111W., three miles southeast of Frontier gas production at Storm Shelter Field. Maurice W. Brown made the high per-acre bid of \$540 at the August sale for an 80-acre lease in section 11, T.50N., R.71W. The lease is two miles northwest of Minnelusa production at FD Field and about a mile and a half southeast of Muddy production in

Springen Ranch Field.

Not all of the increased gas activity is taking place in southwest Wyoming. Coastal Oil and Gas Corp. has drilled several coalbed methane wells in their Sasquatch Unit in T.47N., R.77W. and T.48N., R.77 and 78W. in the Powder River Basin. Coastal plans to drill a total of 20 to 30 wells in the next 18 months. Gilmore Oil and Gas staked four coalbed methane tests just a few miles north of Coastal's unit. BETOP is also staying active in the Powder River Basin's coalbed methane play. They staked nine new locations in Campbell County; most of the locations are in Dead Horse Creek Field in T.49N., R.75W. Conquest Oil staked two tests of Ferris Formation coal seams in the Hanna Basin. One of the tests will be in section 30, T.24N., R.83W. and the other in section 23, T.23N., R.83W.

DeBruin and Jones (1989) estimate that the resource of in-place coalbed methane in Wyoming is between 7.25 and 145 trillion cubic feet. The more conservative estimate of this resource is one third as large as the current estimate of discovered methane in the entire State (23 trillion cubic feet). And that latter estimate does not include any figures for coalbed methane.

Based on company data and on information compiled and published by Petroleum Information, the following significant exploration and development events occurred in Wyoming during the third quarter of 1989:

A. Activity in the Overthrust Belt has picked up during the past few months. Exxon reported a discovery which has been named Collett Creek Field. The 1 Collett Creek Unit well in section 19, T.21N., R.118W. (bottom hole location in section 20, T.21N., R.118W.) flowed 601 barrels of 45.6° API gravity oil and 2.11 million cubic feet of gas per day from the Ordovician Bighorn Dolomite.

B. Exxon also scheduled a Bighorn test about three quarters of a mile south of an Exxon Bighorn Dolomite producer in Road Hollow Field. The new well, the 1 Bridger Fork Unit will be drilled in section 4, T.20N., R.119W. Through June, 1989, two wells in Road Hollow Field had produced a little over 1 million barrels of oil and 20 billion cubic feet of gas from the Bighorn.

C. Exxon also spudded their 1 Rockslide Unit well in section 12, T.23N., R.118W. to test the Madison Limestone and Bighorn Dolomite. This well is about 15 miles north of significant Bighorn production in the Overthrust Belt.

D. Amoco Production Co. decided not to drill its 1 Sohare Unit well to test the Madison in section 35, T.43N., R.112W. The company cited economic considerations for the cancellation. Amoco estimated the well would have cost \$3 million to drill.

E. ANR Production completed a new Dakota producer on the west side of Lincoln Road Field.

The 1-24 Raptor Unit well in section 24, T.24N., R.112W. flowed 750,000 cubic feet of gas and 622 barrels of 49° API gravity condensate per day.

F. Lincoln Road Field has another producing Dakota well drilled by Thermal Exploration in section 8, T.24N., R.111W. The 3-8 Raptor Unit well was tested for 241 barrels of condensate and 5.8 million cubic feet of gas per day. Through June of 1989, Lincoln Road Field had produced nearly 900,000 barrels of oil/condensate and over 30 billion cubic feet of gas. The field produced 220,000 barrels of oil/condensate and 6.15 billion cubic feet of gas through the first half of 1989.

G. Presidio Exploration completed a Frontier extension to Seven Mile Gulch Field. The 1 State of Wyoming/AH well in section 16, T.21N., R.111W. flowed 407,000 cubic feet of gas and 39 barrels of oil per day. The new producer is about two miles northeast of the field discovery completed by Amoco in 1976.

H. WEXPRO Company's development program in Church Buttes Field is yielding some very good results. The 52 Church Buttes Unit well in section 34, T.18N., R.112W. flowed four barrels of condensate and 710,000 cubic feet of gas per day from the Dakota; the 48 Church Buttes Unit well in section 11, T.17N., R.112W. flowed 3.34 million cubic feet of gas per day from the Frontier Formation; the 47 Church Buttes Unit well in section 1, T.17N., R.112W. flowed 1.24 million cubic feet of gas per day from the Frontier; the 57 Church Buttes Unit well in section 9, T.17N., R.112W. flowed 2.91 million cubic feet of gas and 24 barrels of condensate per day from the Dakota; the 46 Church Buttes Unit well in section 3, T.17N., R.112W. flowed 2.02 million cubic feet of gas per day from the Frontier; the 55 Church Buttes Unit well in section 22, T.17N., R.112W. flowed 4.80 million cubic feet of gas daily from the Frontier Formation; and the 63 Church Buttes Unit well in section 18, T.16N., R.112W. flowed 3.42 million cubic feet of gas and 36 barrels of condensate per day. Together these seven new wells flowed 18.44 million cubic feet of gas and 60 barrels of condensate daily. WEXPRO is currently drilling or testing eight additional wells in the area and has staked locations for eight other wells.

I. The Muddy Sandstone is currently being tested in General Atlantic Resources' 23-1 Warren Livestock well in section 23, T.13N., R.68W. in Borie Field. A drill-stem test in the Niobrara recovered 1,500 feet of gas and 200 feet of gas-cut oil. The sample chamber contained 1,500 cubic centimeters of mud-cut oil and 0.1 cubic feet of gas. Borie Field produced an average of 462 barrels of oil and 335,000 cubic feet of gas per day in June, 1989. The field has produced nearly 3.1 million barrels of oil and over 675 million cubic feet of gas since it was discovered in 1949.

J. Buck Draw North has another excellent Dakota producer. Kerr-McGee Corp. completed the 31-7

North Buck Draw Unit well in section 7, T.41N., R.73W. The well flowed 2,333 barrels of oil and 3.58 million cubic feet of gas per day.

K. A fourth Minnelusa producer was completed in Widge Field by Union Texas Petroleum. Their 5 Wright 24 well in section 34, T.46N., R.72W. was completed on pump for an initial potential of 60 barrels of 37.2° API gravity oil, 27,000 cubic feet of gas, and 18 barrels of water per day. Widge Field was discovered in 1987 and has produced over 190,000 barrels of oil and nearly 32 million cubic feet of gas through June, 1989.

L. EP Operating was still pump-testing its 32-24 Dunlap well in section 24, T.48N., R.72W. at last report. They recovered 182 barrels of oil on an earlier 18-hour pump-test. The well is a Minnelusa offset to the Ridgeview Field discovery.

M. Ampolex Inc. discovered WD Field with their 34-34 Wolff well in section 34, T.49N., R.71W. The Minnelusa producer was completed for 359 barrels of oil per day. The company's 21-3C-T well in section 3, T.48N., R.71W. offsets the discovery and is currently producing 320 barrels of oil daily.

N. West Prong Field has its third and fourth Minnelusa producer. Quintana Petroleum completed the 1-35 Wood well in section 35, T.51N., R.68W. for an initial pumping potential of 617 barrels of 20° API gravity oil per day. Quintana completed the 3-35 West Prong-Federal, also in section 35, pumping 450 barrels of oil daily.

O. The 13-34 Lois-Federal well, in section 34, T.51N., R.70W., drilled by Pacific Enterprises Oil discovered oil in the Minnelusa. The well pumped 505 barrels of oil per day. Pacific Enterprises has staged three additional Minnelusa tests in the area.

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Geological Survey of Wyoming

COAL UPDATE

Coal production in Wyoming for 1989 is apparently heading for another all-time record high. Reported coal deliveries from the State's mines for the first 5 months of the year are about 6.5 million tons ahead of deliveries for the same period in 1988. If coal deliveries during the last 7 months of 1989 only equal those made during the same period in 1988, Wyoming's coal production should reach 170 million tons.

Much of the increase in coal deliveries this year are due to a surge in coal sold on the spot market. Almost twice as much spot coal was delivered during the first 5 months of 1989 as was delivered during the same period in 1988. Nearly 5 million tons of spot coal was delivered during the first 5 months of this year; this amounted to about 7.5 percent of the total deliveries. The increase in coal deliveries in 1989 is occurring primarily in existing rather than new coal markets; major increases in deliveries were noted in Texas, Oklahoma, and Indiana while decreased deliveries occurred only in Illinois, Nevada, and Oregon.

Because of these observed increases in coal deliveries as well as the increased activity in coal contracts (summarized later in this report), our production forecast from the second quarter has been revised upward to reflect this (Table 1). Most of the future coal production increases will occur in the Powder River Basin and Campbell County in particular. The large, efficient surface mines in the eastern Powder River Basin are capable of producing large amounts of low-sulfur compliance coal (i.e. coal that can meet the standards set by the Clean Air Act for sulfur dioxide emissions). In addition, Powder River Basin coal is available to electric utility companies at relatively low prices. The demand for coal from southern Wyoming should remain about the same. By 1995, Wyoming could be producing almost 200 million tons of coal annually.

Many coal market analysts that have examined various "acid rain" control measures proposed as bills to Congress (including the legislation proposed by President Bush) agree that if individual coal-fired generating plants are allowed to proceed with emission reduction in the best, most efficient, and most economical manner, many of the plants will choose to burn low-sulfur coal. Much of the remaining low-sulfur coal occurs in the western United States and the analysts estimate that from 10 to 60 million tons of additional coal from this area could be required. A large percentage of this additional coal will certainly come from the eastern Powder River Basin. If the final "acid rain" legislation favors the use of low-sulfur western coal, our coal production forecasts for the early- to mid-1990s may be conservative.

Additional data on Wyoming's 1988 coal production became available in the third quarter of 1989. Coal produced from State of Wyoming leases in 1988 declined to almost half of that produced in 1987. The 3.5 million tons produced on State leases generated royalties of about \$4.6 million, a decrease of \$1.6 million (or 26 percent) from 1987. The average value of this coal increased from \$7.31 per ton in 1987 to \$10.36 per ton in 1988 because a large percentage of the coal produced in 1988 was higher priced coal from Sweetwater County. About 145.9 million tons of coal were produced on Federal coal leases in Wyoming in calendar year 1988, an increase of 21 percent from 1987. The U.S. Department of the

Interior's Minerals Management Service reported that this coal had a total market value of \$1.4 billion (average value of \$9.62 per ton) and generated royalties of about \$91.9 million. The State of Wyoming receives half the Federal royalties collected on the coal.

Another report on Federal coal (U.S. Department of the Interior, 1989) was released in the third quarter of 1989. This report discussed coal produced on a fiscal year basis rather than a calendar year basis as above. It was reported that Wyoming coal mines accounted for 71 percent (or 133.4 million tons) of the total 187 million tons of Federal coal produced in Fiscal Year 1988. Montana and Utah accounted for 11 percent and 8.2 percent, respectively, of the Federal coal produced. Production of Federal coal in Fiscal Year 1988 accounted for 19.5 percent of the total coal production in the U.S.

In coal transportation news, the 8th U.S. Circuit Court of Appeals recently overturned an April, 1988, jury verdict that awarded \$600 million to the State of South Dakota in connection with a cancelled water contract for the Energy Transportation Systems, Incorporated (ETSI) coal slurry pipeline project. Although most of the other lawsuits filed by ETSI against western railroad companies have been settled out of court, an appeal still pending in the 5th Circuit Court of Appeals with Santa Fe Southern Pacific Corporation (SFSP) could be influenced by this latest reversal. To date, ETSI has received about \$250 million in settlements from five railroads involved in the lawsuits.

In July, Burlington Northern Railroad (BN) signed a new long-term coal transportation contract with American Electric Power (AEP). The 10-million-ton per year contract replaces an existing coal transportation contract that was due to expire in 2.5 years. It also adds new coal tonnage recently contracted by AEP for Indiana-Michigan Power Company's Rockport Unit 2 (see story below in Coal contracts - Powder River Basin). The new contract covers coal shipments from Carter Mining Company's Rawhide and Caballo mines to Rockport Unit 1 in Indiana as well as new shipments from the Rochelle mine to Rockport Unit 2, which will begin in 1990.

Developments in western and southwestern Wyoming

In July, Arch Mineral Corporation purchased Bitter Creek Resources' recently-opened Stansbury underground mine. As part of the purchase agreement, Arch Mineral paid off a \$950,000 loan that the State of Wyoming had given Bitter Creek Resources to help start the mine. Evidently a 15,000-ton per month contract that the mine had to supply coal to Pacific Power and Light's (PP&L) Jim Bridger plant will continue, even though no shipments have been made to the plant since early in 1989. Arch Mineral Corporation and its subsidiary Arch of Wyoming, which operates the Seminole 2 and Medicine Bow surface mines in the

Hanna Basin, are conducting engineering studies at their new underground mine to determine how to expand production and increase efficiency at the mine. Arch is also attempting to find additional customers for the high quality bituminous coal.

Another development that might affect southern Wyoming coal markets is the possibility that the Los Angeles Department of Water and Power (L.A.) might conduct a test burn of Wyoming coal at its Intermountain Power Project (IPP) in Utah. When IPP was constructed, L.A. agreed to use only Utah coal in the generating units. If there is not enough Utah coal available at an agreeable price, L.A. may turn to Wyoming to expand its coal supply base for the project.

Developments in the Hanna Coal Field

Development activity in the Hanna Basin was relatively quiet during third quarter 1989. Cyprus Coal Company, owner of the Shoshone No. 1 underground mine north of Hanna, has been repairing, rebuilding, and improving its longwall operation in this mine with the intent of doubling the mine's capacity. The mine is currently capable of producing about 1.5 million tons per year. The mine has a 14-year, 1.3-million-ton per year contract and sells about 0.2 million ton per year as spot sales.

Arch of Wyoming is supplying an unspecified amount of coal to Holly Sugar Company's Torrington, Wyoming sugar beet plant. This plant uses about 20,000 tons of coal per year on a seasonal basis. The specific Hanna Basin coal mine that will supply the coal is not known, but it is probably the Medicine Bow mine.

Developments in the Powder River Basin Coal Field

Coal production at Wyodak Resources Development Corporation's Wyodak mine east of Gillette was slowed this summer because of a shutdown at Pacific Power & Light Company's nearby Wyodak generating plant. A turbine problem discovered at the plant during routine maintenance caused the shutdown and halted coal deliveries from Wyodak. Coal production at Wyodak was expected to decrease by 330,000 tons this year as monthly production dropped from 197,000 tons to 72,000 tons. Coal shipments to Wyodak's other customers continued and no layoffs of personnel were made. The Wyodak plant was expected to be back in operation in August, 1989.

Powder River Basin coal appeared to be making inroads into the eastern United States as coal deliveries from Wyoming have been made to New Hampshire, New York, and Georgia so far this year. Spot coal for use in test burns has been shipped from Wyoming, Colorado, and Montana to Public Service New Hampshire's Merrimac generating plant.

In February of 1989 Rochelle Coal shipped a small delivery to the Carson, New York generating

plant (operated by Jamestown Board of Public Utilities).

In August, Nerco Coal Corporation's Antelope mine sold 80,000 to 90,000 tons of spot coal to Georgia Power Company (GPC). This sale has been called "the farthest eastern penetration of western coal into the eastern markets not officially called a test burn" (McGraw-Hill, Inc., 1989). The coal was shipped 1,900 miles by BN to GPC's Yates and Wansley power plants near Atlanta, Georgia. The Wyoming coal was blended with 90 percent Illinois coal at a transloader location along the Mississippi River in Alabama and then was shipped by rail to the power plants.

Coal contracts - Powder River Basin

Two long-term contracts for Wyoming coal were announced in the third quarter, 1989. Peabody Coal Company of Wyoming signed a 15-year, 0.8 million ton per year coal supply contract with Empire District Electric Company (EDECO) and a 15-year, 3-million-ton per year coal supply contract with American Electric Power Service Company (AEP). The contract with EDECO calls for Rochelle Coal Company's Rochelle mine (located in southern Campbell County) to supply coal to EDECO's Asbury and Riverton plants in southeastern Kansas beginning in April, 1990. The coal will originate on Chicago and North Western Railroad (C&NW) at Rochelle and then be delivered via Union Pacific (UP) and Kansas City Southern (KCS) rail lines. The new contract with Rochelle replaces EDECO's expiring 19-year contract with a Pittsburgh and Midway Coal Mining Company mine in Kansas.

The new AEP contract calls for minimum deliveries of 3 million tons of coal per year from the Rochelle mine to AEP's Rockport 2 plant (operated by Indiana-Michigan Power Company). The coal will be delivered to the Rockport, Indiana plant via Burlington Northern Railroad (BN) to Metropolis, Illinois where it will be transloaded on barges and shipped the remaining distance on the Ohio River. Carter Mining Company currently supplies 4.75 million tons of coal per year to the Rockport Unit 1 and evidently AEP is negotiating the purchase of an additional 2 million tons per year from other coal suppliers in the Powder River Basin, Wyoming.

Activity in spot and short-term coal supply contracts was brisk in the third quarter of 1989. The activity is summarized below:

- 1) Cordero Mining Company, a subsidiary of Sun Coal Company, has most likely won a contract for 239,400 tons of spot coal for the Lower Colorado River Authority's (LCRA) Fayette Units 1 and 2 in Texas. Published bids for the coal ranged from the low of \$3.50 per ton F.O.B. mine submitted by Cordero for 8,375 Btu/pound coal to a high of \$4.95 per ton for 8,775 Btu/pound coal.
- 2) Amax Coal Company supplied Northern Indiana Public Service Company (NIPSCO) with 100,000 tons of coal for July as the utility continued to purchase spot coal on a monthly basis. This spot sale will be supplied from the Belle Ayr mine to various Indiana power plants.
- 3) Carter Mining Company's Rawhide mine, Mobil Coal Producing Incorporated's Caballo Rojo mine, and Triton Coal Company's Buckskin mine have delivered a total of about 0.5 million tons of spot coal to Grand River Dam Authority (GRDA), Oklahoma so far this year. GRDA has increased its coal usage this year as demand for electricity and off-system power sales increase.
- 4) Amax Coal Company and Exxon Coal and Minerals (of which Carter Mining Company is a subsidiary) both signed contracts for 325,000 tons of spot coal each for Houston Lighting and Power Company's Parrish, Texas generating plant. Coal from the Belle Ayr and Caballo mines will be delivered through December, 1989 via Burlington Northern and Santa Fe Railroads.
- 5) Cordero Mining Company is supplying up to 1.0 million tons of spot coal from its Cordero mine to Iowa-Illinois Gas and Electric Company's Louisa, Iowa plant. Deliveries of this coal began in July and will continue until the end of the year. Cordero supplies the same utility with contract coal under a 20-year agreement. Burlington Northern and Soo Line railroads will deliver the coal.
- 6) Kerr-McGee Coal Corporation's Jacobs Ranch mine will supply 50,000 tons of spot coal (with possibly an option for an additional 25,000 tons) to the Fremont, Nebraska Department of Utilities. Deliveries began in late June and will continue through late 1989. The coal was priced at \$4.00 a ton F.O.B. Jacobs Ranch mine and \$14.95 a ton delivered via Burlington Northern. Although Carter Mining Company submitted a lower bid of 86.7 cents per million Btu's delivered, as compared to 86.9 cents per million Btu's delivered from Jacobs Ranch, Kerr-McGee was able to offer quality guarantees that made their coal more attractive to the utility. Six of the bids on this contract solicitation were all below 90 cents per million Btu's delivered.
- 7) Rochelle Coal Company signed a spot coal contract with Dairyland Electric Power Cooperative to supply 140,000 tons of coal to the Alma and Genoa, Wisconsin power plants. The coal deliveries, which started in July, will run through the fall of 1989 via Burlington Northern and river barges at St. Paul, Minnesota.

- 8) Amax Coal Company's Belle Ayr mine will supply 250,000 tons of coal to Omaha Public Power District's Nebraska City plant and possibly to the North Omaha, Nebraska generating plant. Deliveries on Burlington Northern began in August and could continue into November, 1989.
- 9) Thunder Basin Coal Company (a subsidiary of Arco Coal Company) and Nerco Coal Corporation will supply a total of 300,000 to 450,000 tons of coal to Consumers Power Company's Cobb, Michigan generating plant. Coal deliveries from the Black Thunder and Antelope coal mines began in the second quarter of 1989.

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INDUSTRIAL MINERALS AND URANIUM UPDATE

Abrasives

Natural abrasives are minerals used for grinding, honing, lapping, superfinishing, polishing, pressure blasting, or barrel finishing (Thrush, 1968). Natural minerals used in abrasives include diamond, corundum, garnet, and quartz. Due to recent health concerns about silica dust, natural quartz has become less popular for all types of abrasives. Garnet has become a more popular low-hardness abrasive, particularly for use in sandblasting and other pressure-blasting applications.

Nationally, most garnet is produced by three companies from large deposits in the Adirondack Mountains of New York, with smaller production from Maine and Idaho. Production of garnet in New York is becoming more expensive due to depletion of the deposits and high costs related to operating in an environmentally sensitive area.

Perhaps for this reason, the Geological Survey of Wyoming has recently received several inquiries about garnet in Wyoming. In Wyoming, garnet is found in certain schists. The largest known occurrences occur in the Haystack Hills of east-

central Wyoming and in the Teton Mountains, outside of Grand Teton National Park. Garnets are also found in the Laramie Mountains, Medicine Bow Mountains, Sierra Madre, and Wind River Range. Placer garnets occur in the Black Hills. If any readers know of or have a garnet deposit, please contact the Geological Survey of Wyoming. There are some companies interested in finding and developing minable garnet in Wyoming.

Bentonite

Bentonite is a clay product that has many uses. It swells many times its dry volume when wet and has a high cation exchange capacity. These properties make it useful as a sealant, in oil well drilling fluid, in lining settling basins, and in certain construction applications. It is also used in iron ore refining, foundry casting, soap, cosmetics, and as a mineral filler in many products.

Bentonite is Wyoming's second most important industrial mineral (after mined trona) in the value of its production. The major producing areas are the Colony area in the northern Black Hills, the Clay Spur area in the southern Black Hills, the eastern Bighorn Basin, the Kaycee area, and near Casper.

Since the main use of bentonite is for drilling muds, the decline in domestic oil and gas exploration has depressed the bentonite industry. However, because other uses of bentonite are increasing, bentonite production in Wyoming is increasing slowly. Bentonite gravels are now being used by seismic operators to prevent blow-outs and to simplify the plugging of shot holes. In addition, newly developed bentonite grouts are making inroads in many downhole applications, including water well completion techniques. Wyoming is still the Nation's largest producer of bentonite.

Cement

Cement is a manufactured product produced by heating high-calcium limestone, shale, and gypsum together. Different grades of cement are made using different proportions of the primary ingredients, or by introducing different additives. There is one cement plant in Wyoming, the Mountain Cement Company's newly remodeled plant south of Laramie. This plant uses limestone from the Permian-Pennsylvanian Casper Formation, quarried just east of the plant; marl from the Cretaceous Niobrara Formation, quarried just west of the plant; and gypsum from the Triassic Chugwater Formation, quarried 40 road miles southwest of the plant. Small amounts of titaniferous magnetite from stockpiles at the old Iron Mountain mine, 50 miles northeast of Laramie, are used as additives.

Production from Mountain Cement's plant is running near capacity. Due to the plant's recent renovation and the high quality marl that is used in the process, this plant is highly competitive in

the regional cement market. The plant employs about 100 people in the Laramie area.

Gypsum

Gypsum is produced by three companies in Wyoming. It is produced for the Mountain Cement plant in Laramie (see Cement). In addition, the Celotex Corporation in Cody and the Georgia-Pacific Company in Greybull mine gypsum and manufacture wallboard. The daily production of gypsum in Wyoming is expected to remain steady for the rest of the year.

According to figures recently released by the U.S. Bureau of Mines, gypsum is produced by 34 companies operating 64 mines in 21 states. The leading states in the production of finished gypsum products are California, Texas, Florida, Iowa, and Nevada. Although Wyoming may be a relatively minor contributor to the Nation's total production of gypsum, wallboard from Wyoming is in demand in Wyoming, Montana, and the Pacific northwest.

Limestone

Limestone is quarried in Wyoming for cement (see Cement), construction aggregate (particularly highway base, sub-base, and surfacing), and for use in emissions control at coal-fired power plants. Wyoming has been exporting crushed limestone from near Hartville to the State of Nebraska for use as aggregate for road construction. In the past, limestone has been produced in Wyoming as dimension stone and as "sugar rock" for use in refining sugar beets.

Limestone production in Wyoming is heavily dependent on road construction. Overall, the long-term production of limestone is expected to increase, especially if markets are established in adjacent states. Limestone production will decrease this winter with the seasonal slowdown in construction.

Mica

Mica is a mineral that can occur in large crystals called "books". Thin, transparent, individual sheets may be split from these "books". In the years before World War II, these sheets were used in heat-resistant windows. Historically, there has been no interest in mica from Wyoming. Recently, however, there have been a few inquiries regarding mica availability for export to the Orient for use in roofing and construction.

Large mica "books" are known to occur in Wyoming primarily in the Tie Siding and Medicine Bow Mountains areas in Albany County, in the Laramie Mountains in Albany, Converse, Laramie, and Platte Counties, and in the Haystack Hills in Goshen County. Today, a large deposit of transparent, sheet mica may be of economic interest.

Phosphate, sulfur, and fertilizer raw materials

At Coastal Corporation's (formerly WYCON's) fertilizer plant west of Cheyenne, fertilizer is produced from urea and ammonia compounds. This plant does not use mineral products in its process. At Chevron's fertilizer plant near Rock Springs, however, phosphate mined in Utah is combined with sulfur produced as a by-product of natural gas refining in Wyoming.

Chevron's fertilizer plant near Rock Springs is operating at a production rate about five percent over its rated capacity, according to company officials. This means that the plant will produce about 450,000 tons of fertilizer in 1989. Regional demand remains high despite a national decrease in the demand for fertilizer.

Silica raw materials

Two high-silica sand or rock deposits have recently been investigated by the Geological Survey of Wyoming (Harris, 1988a and 1988b). A third deposit in the Lovell area is now under investigation by the Geological Survey of Wyoming. The study has been funded through the Wyoming Economic Development and Stabilization Board. The reason for all of these studies is the great interest in the possible production of glass in Wyoming. This recent interest is due to several factors: more favorable transportation rates, new ways of manufacturing and transporting glass, and promising research into heat resistant ceramics, which may be substituted for metal in products such as automobile engines.

Wyoming contains within its borders all of the major raw materials used to make glass including silica, soda ash (refined trona), feldspar, limestone, pigments, and others. Several companies are currently investigating the development of a glass plant in Wyoming. It appears now that a glass and ceramic manufacturing industry may be a real possibility in Wyoming's future.

Stone

Dimension stone has been produced in Wyoming in past years for local and regional construction. Until the mid-1950's, the Jay Em Stone Company in Jay Em, Wyoming produced monument stone and finished monuments from Wyoming stone. The major suppliers of dimension stone are currently Italy and other foreign sources, Indiana limestone, Georgia marble and granite, Vermont marble and granite, and a few quarries in other states including Tennessee, Alabama, Missouri, and Colorado.

With improving transportation rates, as well as increasingly restrictive environmental regulations in populous areas, it is becoming more advantageous for a dimension stone producer to locate in the West. Although no producer has

decided to locate in Wyoming, several have visited and looked at various stone types and occurrences. Wyoming has an incredible variety of stone, particularly granite of all types and colors, as well as quartzite, sandstone, and a little marble. Stone offers another potential industry for Wyoming.

Trona

The production of soda ash (refined trona) and other sodium chemical products in Wyoming continues at record levels. As expected, the soda ash producers, which are now operating near capacity, have seen an increasing market. Two plants announced expansion plans during the last quarter.

Tenneco Minerals Co., and Tg SodaAsh both plan plant expansions. Tenneco's expansion will create 10 new jobs and result in the production of about 125,000 more tons of soda ash per year. Tg SodaAsh's plans, which call for increasing capacity by 100,000 tons per year, will create only one or two additional jobs. The current growth in production at the soda ash plants is the result of increased efficiency rather than increases in manpower.

The soda ash producers see continued increases in the demand for their sodium products. In addition to the production of soda ash, there have been increases in the demand for caustic soda and sodium cyanide. Sodium cyanide is being used to extract gold from Nevada, Washington, and Montana ores.

Exports continue to hold promise as a way of increasing demand for Wyoming soda ash. Most soda ash produced in the Orient is manufactured by the Solvay process, which is more expensive than refining mined trona. Import tariffs have kept the price of American soda ash high in Japan, Korea, China, and Taiwan. During the past quarter, however, Taiwan has cut its tariff on soda ash. If other Pacific Rim countries follow suit, there will be a greatly increased demand for American soda ash. Wyoming produces over 90% of all American soda ash.

On a related theme, the recent unrest in the People's Republic of China has not affected export sales of U.S. soda ash. China buys more soda ash from the U.S. than any other foreign country. China's purchases of soda ash now require a letter of credit, however, rather than being continued on a draft basis. Exports to China are expected to decrease in the future as China develops its own soda ash production. Increased exports to other countries should take up the slack resulting from China's decreased requirements.

Uranium

Uranium is still produced at three localities in Wyoming. Pathfinder Mines mines uranium ore by open-pit methods and mills the ore into yellowcake (uranium oxide, U_3O_8) at Shirley Basin. Everest

Minerals and Malapai Resources mine uranium by in situ solution mining methods and produce yellowcake at the Highland property and the Irigary-Christensen Ranch property, respectively. Both of these operations are in the Powder River Basin. U.S. Energy has produced yellowcake from the Crook's Gap area. Presently, low uranium prices have suspended this project.

The uranium spot market price of \$9.80 per pound of yellowcake is at a new low. Uranium industry officials see this low spot market price continuing, according to an article in the Casper Star-Tribune. Low prices resulting from an oversupply of yellowcake should continue to plague the industry through the early 1990's.

Other uranium-producing states are feeling the effect of this depressed market. Chevron Uranium announced in September that it is going to close its Mount Taylor uranium mine in west-central New Mexico. This mine was one of New Mexico's largest, and its closing may affect other mines in the Grants area. Because Chevron's ore is milled by Homestake, there may not be enough ore for the mill to operate at a profit; thereby, requiring the closure of the mill and the other mines in the area.

In July, the U.S. Senate approved a bill designed to help the Government's uranium-enrichment programs. This legislation would enable the U.S. to continue to enrich uranium from about 0.07% U-235 to the 3.0% U-235 that is used to produce heat for the generation of electricity.

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METALS & PRECIOUS STONES UPDATE

In the summer and fall of 1989, companies and individuals continued to explore Wyoming for gold, platinum, and palladium. Drill rigs were testing precious metals targets in the South Pass and Medicine Bow Mountains areas at the end of this quarter. Exploration for precious metals also continued in the Bighorn Basin, Bear Lodge

Mountains, Mineral Hill district, and in the Silver Crown district. One Australian firm, Carr Boyd Minerals, Ltd., conducted an airborne multi-spectral scanner survey of Wyoming's Archean terrain. According to the Engineering and Mining Journal (July, 1989, p. 72), the company's multi-spectral scanner is capable of delineating a diverse range of mineral deposits. The scanner has been used successfully in Western Australia to identify auriferous (gold-bearing) shear zones and diamondiferous lamproites.

During the third quarter, inquiries about Wyoming's base metal (copper, lead, and zinc) resources, continued to increase. This interest is stimulated by the current high prices for base metals, and by the State's relatively untapped wealth in these metal deposits.

In addition to company interest, the Metals and Precious Stones Division of the Geological Survey of Wyoming initiated a research project to study the mineral deposits in the Seminoe Mountains district of central Wyoming and continued its investigations for diamond deposits in the Laramie Range.

As a note of interest, the Geological Survey of Wyoming is scheduled to receive about 12 tons of drill core from the U.S. Bureau of Mines in October. This core is from the Bureau's drilling projects on strategic mineral deposits in Wyoming back in the 1940s. Some of the drill core is from the New Rambler and Copper King deposits, both of which are currently being explored for precious metals.

Black Hills uplift

Gold exploration is reported in two regions of the Black Hills. In the Bear Lodge Mountains north of Sundance, mining companies continued to search for large-tonnage, low-grade gold mineralization in feldspathic trachyte breccias. In the Mineral Hill district to the east, TRYCCO, Inc. continued testing placers for gold, tantalite, and cassiterite.

Bighorn Basin

The Casper Star-Tribune (August 22, 1989) reported that American Mining and Milling (AM&M) from Gillette, Wyoming, has applied for a permit to mine gold and silver from stream gravels in the Clarks Fork River in Park County. American's application to the State Department of Environmental Quality includes a patrol at the mine site. The known gold deposits in this region occur in small placers (Hausel, 1989, p. 34).

In the same general region, American Mining and Milling, has also expressed interest in recovering gold from the Sand Coulee placer north of Cody. The Sand Coulee is a relatively small drainage containing abundant garnet and common gold flakes from an unknown source.

Laramie Range

The Geological Survey of Wyoming continued its search for diamond deposits in the central Laramie Range. Several significant heavy mineral anomalies discovered by the State Survey (Hausel and others, 1988), are being examined in greater detail. With the help of electromagnetic and magnetic surveys, the Survey is investigating the site from which one stream-sediment sample yielded nearly 100 pyrope garnets. These garnets indicate that there may be a kimberlite in the area.

Medicine Bow Mountains

The Geological Survey of Wyoming has begun a study of historic mines in the Medicine Bow Mountains. Samples are being collected for assay, and ore shoots are being investigated for their type and geometry.

Elsewhere, at least three drill rigs were testing precious metal targets during the third quarter of 1989. According to the Engineering and Mining Journal (December, 1988, p. 72), Vanderbilt Gold Corporation was investigating two gold-platinum properties in the Mullen Creek and Lake Owens areas. At Mullen Creek, the company's magnetic surveys, geological mapping, and stream-sediment analysis defined at least two targets worth drilling. At Lake Owens, magnetic surveys, soil sample geochemistry, geologic mapping, and outcrop sampling identified three drilling targets.

Seminoe Mountains

The Geological Survey of Wyoming has begun investigating the mines and geology of the Bradley Peak area of the Seminoe Mountains greenstone belt north of Rawlins. Based on an initial reconnaissance study of the area, with one exception the belt is similar to the South Pass greenstone belt in the Wind River Range of western Wyoming. The Seminoe Mountains belt lacks a thick metagreywacke succession, and is dominated by a relatively thick ultramafic unit containing serpentinites and tremolite schists. These ultramafic rocks are similar to high-magnesian rocks found in South Africa and Western Australia, and are interpreted to represent metamorphosed dunite and peridotite sills, and peridotitic and basaltic komatiite flows. Several of the basaltic komatiites in the Seminoe Mountains have relict spinifex textures typical of basaltic komatiites elsewhere in the world (Snyder and others, 1989).

In Western Australia, commercial nickel deposits are found near the base of komatiite flows. Using this model, the Geological Survey of Wyoming is sampling gossans in the Bradley Peak komatiites to test for anomalous nickel concentrations.

The Bradley Peak area also has several historic gold mines and prospects localized in carbonated and chloritized metagabbro and

metabasalt (Klein, 1981). These are being mapped in detail to identify ore shoots and potential areas of gold and copper mineralization. Many of the veins are isoclinally folded suggesting the possibility of ore shoots in fold closures, and the State Survey has also recognized stockworks suggesting the possibility of unrecognized large-tonnage, low-grade gold deposits.

Banded iron formation in this region also show zones of carbonation and pyritization. The banded iron formation is being investigated as a potential iron resource as well as a potential host for epigenetic gold deposits.

Structurally, Bradley Peak is complex. Brittle deformation related to the Laramide orogeny has overprinted many Archean structures, and at least two and possibly three Archean folding events have taken place. The initial event was an isoclinal folding event, which was overprinted by a later open folding event which included some chevron geometries.

South Pass

The State Survey has completed its field investigations of the South Pass greenstone belt and is preparing a final report on the geology and mineral deposits, as well as a small scale (1:48,000) geologic map of the belt compiled from eight, detailed, 1:24,000-scale geologic maps authored by the Survey. Research by the State Survey in the South Pass region has indicated South Pass has high potential for hosting significant commercial gold and iron deposits. The region also has some potential for commercial tungsten, nickel, copper and silver mineralization. Other interesting metals identified in anomalous amounts include tin and chromium. The potential for hidden gold deposits is also considered to be high. A few results from this study were recently published in Hausel (1989), but the final report is still forthcoming.

Many gold deposits in the South Pass greenstone belt are found in ore shoots in shear zones. Finding the local ore shoots in the more extensive shear zones has always been a problem in the greenstone belt, but geochemical data along with detailed geological mapping has shown ore shoots to be localized at intersections of structures, at fold closures, and at slight attitude changes in veins. Although more detailed work is necessary, it now appears that ore shoots are locatable through detailed geological mapping.

Exploration and mining activity this summer in the South Pass greenstone belt included gold recovery from the Stout placer mine on Rock Creek, some claim staking, and drilling by two mining companies at undisclosed locations.

Silver Crown District

Royal Gold, Inc., of Denver reportedly signed an option agreement with Henrietta mines of

Vancouver, British Columbia and Kirkwood Exploration of Casper, Wyoming to purchase all of the outstanding shares in the Copper King property located between Laramie and Cheyenne. The Copper King is a mineralized porphyry which contains reported reserves of 3.6 million tons of ore averaging 0.4% copper and 0.04 ounce/ton gold (Engineering and Mining Journal, May, 1989, p. 73).

Field trips, seminars, and recent articles

The Metals and Precious Stones Division of the Geological Survey of Wyoming worked with George Snyder and Terry Klein of the U.S. Geological Survey; Robert Houston of the University of Wyoming; and Paul Graff, consultant from Casper, to organize and co-lead an International Geological Congress field trip through the Archean geology and mineral deposits of parts of Wyoming. Field trip participants began on July 19th in the Hartville uplift; traveled through the Elmers Rock greenstone belt of the Laramie Range; examined shear zone structures and related folds in the Medicine Bow Mountains; toured the Seminole Mountains and South Pass greenstone belts; and finished on July 25th in the Copper Mountain supracrustal belt of the Owl Creek Mountains. The attendees included delegates from China, the Soviet Union, Spain, France, South Africa, Sierra Leone, and the United States. One of the many highlights of the field trip was the recovery of several hand specimens from South Pass that contained visible gold.

On Saturday, September 16th, the Head of the Metals and Precious Stones Division also taught a seminar on methods used to find and identify gold and diamond deposits. The seminar was so well received that additional seminars, including field trips, are being considered for next year.

The Division published one paper and one abstract outside the State Survey during the past quarter:

1) Hausel, W.D., Erlich, E.I., and Sutherland, W.M., 1989, Timing of alkaline and ultramafic-alkaline volcanism within the Russian, the Siberian, and the North American ancient platforms [abstract] in Continental magmatism: New Mexico Bureau of Mines and Mineral Resources Bulletin 131, p. 123.

2) Snyder, G.L., Hausel, W.D., Klein, K.L., Houston, R.S., and Graff, P.J., 1989, Precambrian rocks and mineralization, Southern Wyoming Province: 28th International Geological Congress Field Trip Guidebook 1332, 48 p.

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Table 1. WYOMING MINERAL PRODUCTION FORECAST TO 1993¹.

Calendar Year	Oil Production ²	Methane Production ³	Carbon Dioxide Production ³	Helium Production ⁴	Coal Production ⁵	Trona Production ⁵	Mined Uranium Production ⁶	In situ Uranium Production ⁷	Sulfur Production ⁸
*1981	122.1	455.4	—	—	102.8	11.8	4.6	—	0.05
*1982	118.7	465.1	—	—	107.9	10.1	2.1	—	0.07
*1983	120.9	539.7	—	—	112.2	10.5	3.0	—	0.57
*1984	127.8	600.1	—	—	130.7	11.0	1.6	—	0.63
*1985	131.0	597.9	—	—	140.4	10.8	0.6	—	0.80
*1986	122.4	563.2	23.8	0.15	136.3	13.3	0.3	—	0.66
*1987	115.9	622.7	110.5	0.84	146.5	13.6	0.2 ⁹	0.06	1.20
*1988	114.3	701.1	110.5	0.84	163.6	14.9	0.3	1.4	1.20
1989	108.0	704.5	110.5	0.84	170.0	15.0	0.2	2.0	1.20
1990	103.6	729.0	110.5	0.84	177.1	18.0	0.2	2.0	1.20
1991	98.1	754.1	110.5	0.84	183.8	18.0	0.1	3.0	1.20
1992	92.9	780.1	110.5	0.84	189.2	18.0	0.1	3.5	1.20
1993	88.0	806.8	110.5	0.84	193.1	21.0	0.1	4.0	1.20

* Actual values for comparison; ¹ Geological Survey of Wyoming, October 1989; ² millions of barrels; ³ billions of cubic feet; ⁴ billions of cubic feet, based on Exxon's estimate that the average helium content in the gas processed at Shute Creek is 0.5 percent; ⁵ millions of tons; ⁶ millions of tons of uranium ore (not yellowcake); ⁷ millions of pounds of yellowcake (U₃O₈), (unknown between 1981-1986 because it was reported only as taxable valuation; estimates for 1989-1993 are based on company information); ⁸ millions of tons, converted from gallons of sulfur produced at gas processing plants as reported to the Wyoming Oil and Gas Conservation Commission; ⁹ includes previously stockpiled ore processed by the Lucky Mc mill in 1987.

Agricultural Outlook

As we move into the winter, the persistent drought problem dominates the Wyoming agricultural outlook. The beautiful fall that most of the state enjoyed was a double edged sword. The lack of any fall storms allowed livestock producers to gather cattle and make unhurried decisions about weaning and culling. However almost all of the ranges are going into the winter period with severe sub-soil shortages. Reservoirs and stockponds are mostly dry, and pastures and fall seeded crops are in danger of winter kill due to the lack of soil moisture. On the positive side of the ledger, is that prices for most agricultural products will remain strong throughout the coming winter and spring.

GENERAL ECONOMY

Growth in the general economy is important to agriculture, and both crop and livestock receipts have benefited from this year's expected 2.8 percent increase in Gross National Product (GNP). Livestock receipts are forecast to climb nearly 2 percent from a year earlier to \$80 billion, and most grain producers have been able to positively cash flow their crops for the first time in many years in spite of lower target prices and loan rates.

Inflationary fears have diminished over the past several months as sharp price increases reported during the first part of the year began to subside. The consumer price index, which is a common measure of inflation, averaged 2.4 percent on a seasonally adjusted basis during the third quarter after hitting 6.4 percent for the second quarter. For the year, the rate of inflation is expected to average near 5 percent, and could drop slightly in 1990.

Forecasts for lower inflation in 1990 are based in part on expectations for slower growth in the general economy. Current weakness within some areas of the manufacturing sector likely will keep wage rate increases very modest and also could limit the creation of new jobs.

While a slow down in economic growth does affect the agricultural sector by reducing total receipts, some of the policy decisions that may be enacted to respond to the slow down would be positive for agriculture. If the Federal Reserve decides to increase the rate of growth in the money supply, this would bring down interest rates and make credit terms more attractive to producers.

The cost of credit remains a major expense for agriculture, accounting for nearly 12 percent of total costs. With current interest rates averaging 11 to 13 percent for short term operating loans, each 1 percent decline in interest rates lowers producer's costs by more than \$1 billion nationally.

GRAINS SITUATION

USDA forecasters have estimated the 1989 corn crop at 7.59 billion bushels, up over 50 percent from 1988's drought induced levels. Prices have responded correspondingly by dropping 30-35 cents per bushel. This is less than earlier anticipated due to expected increased demand both domestically and in the export market. Prices will likely remain uncertain, with a downward bias as we move into the spring. Weather will play an important part in next spring and summer outlook. A dry spring could cause sharp price rallies in April and May, thus negatively impacting spring feeder cattle prices.

U.S. wheat production in 1989 increased over 12 percent from year earlier levels. Prices have still remained strong due to reduced U.S. stocks and improved outlook for export. Wheat export commitments continue to run about seven percent above year ago sales. Additionally, large portions of the winter wheat producing areas (notably Kansas) are moving into winter with shortages of soil moisture. Current outlook will be for net prices to trend lower, with up-movements sparked by export sales and continued dry weather impacts.

LIVESTOCK SITUATION

Prices for feeder cattle have continued strong this fall despite continued narrow margins for cattle feeders. Feed costs have not declined to the extent of earlier forecasts, nor have fed cattle prices moved to the higher levels of some earlier expectations. However, cattle feeding margins are expected to remain tight and likely will temper feeder cattle price increases into early 1990. Prices for lightweight feeders and calves also are expected to trend higher into the early spring, reaching into the \$105-\$110/cwt range for 4-500 pound steer calves.

Feeder steer prices have remained at a strong premium to fed steers, averaging \$12-\$13 per cwt higher since mid-year. Lower costs of gain and the expected uptrend in fed cattle prices likely will

keep that premium around \$12 into late winter. During the spring months, the feeder price premium is expected to decline as fed cattle prices rise seasonally. A seasonal decline to the lower \$80's for 6-800 lb feeders is anticipated next spring.

Wheat pasture prospects in the Southern Plains have deteriorated in recent weeks, hampered by lack of moisture. Similar conditions a year ago led to large movements of cattle off wheat pastures in early 1989. Forced movement off those winter wheat pastures may push prices back into the \$90-\$100/cwt range as they did last spring.

Slaughter steer prices rebounded sharply in October. After slipping into the upper \$60's early in the month, prices returned to the mid \$70's by month's end. Cattle slaughter will remain below a year earlier into mid 1990 and should support a seasonal price rise into late winter or early spring. Cattle feeding margins will remain tight as higher feeder cattle prices offset declines in feed costs.

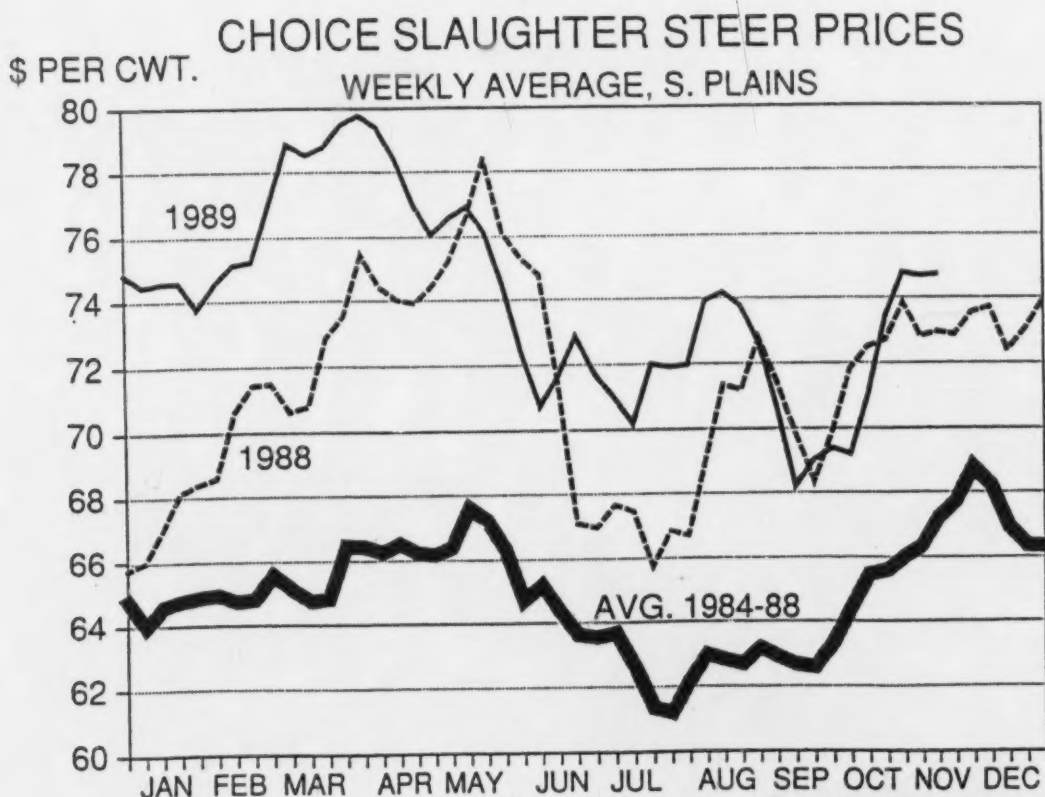
Feedlot inventories in the 13 major cattle feeding states were near historical lows on

October 1, 6 percent below both last year and the five-year average for that date. January-March 1990 fed cattle marketings will be partially drawn from the inventory of lighter cattle on feed October 1. However, those record low lightweight feedlot inventories will be augmented by October-December placements, estimated slightly larger than a year ago. Fed cattle marketings during the first quarter of 1990 are expected to average about 2 percent above the low level of a year earlier.

Although January-March 1990 fed cattle marketings are expected to rise, smaller nongrain-fed marketings will offset most of the increase, holding total cattle slaughter about even with a year earlier. Choice slaughter steers are expected to equal 1989 averages for the first quarter of 1990, and move higher as we roll into the April, May, June quarter, perhaps reaching the high \$70's to lower \$80's during this period.

Robert D. Carver
Professor Agricultural Economics
University of Wyoming

Table 2



Western Livestock Marketing Information Project
Cooperative Extension Service

Wyoming Coincident Indicators Index

There have been several changes to the Wyoming Coincident Indicators Index (WCII) for 1989. The U.S. Index of Four Roughly Coincident Indicators has been revised and the base year changed from 1967 to 1982 (U.S. Index = 100 for the year 1982). To be consistent with the U.S. Index the WCII has also been changed to a base year of 1982 (WCII = 100 for the year 1982). Additionally some of the data were revised for the WCII. The annual revisions to the "Employment" series used in the WCII have been included, and the "Total Sales and Use Tax" series has been revised to eliminate the statistical disturbances created by county optional rates. Additional time was required to make these revisions, and consequently, the first quarter WCII for 1989 was not published on schedule. However, this article includes results for both the first and second quarters of 1989. The graph of the Non-seasonally Adjusted WCII has been eliminated since it does not contribute to the analysis. For these reasons the WCII may look quite different, but the changes allow for a more direct comparison of the Wyoming economy to the U.S. economy. For this analysis all data series have been seasonally adjusted, and data for the variables of total covered wages, and sales and use tax collections have been deflated using the U.S. consumer price index.

The WCII is derived using several economic variables which tend to change concurrently with the overall Wyoming economy. The index is computed quarterly by the Division of Research and Statistics, Department of Administration and Fiscal Control. The WCII is composed of four variables which are: 1) total State employment, 2) total wages reported for the quarter, 3) total sales and use tax collections, and 4) an industrial index. The industrial index is a composite of variables which represent three important Wyoming industrial sectors. For the industrial index, mining is represented by the number of active oil well drilling rigs; the agricultural sector is represented by an index of prices received for all Wyoming agricultural commodities; and tourism is represented by the total volume (in gallons) of motor fuels plus gasohol sold.

FIRST QUARTER 1989 WCII

Annual Comparison:

The first quarter 1989 seasonally adjusted WCII continued to hold within a stable range

maintained for eleven quarters since mid 1986. However, the first quarter 1989 index did show definite weakness when compared to the year before. An annual comparison of seasonally adjusted WCII values (first quarter 1989 to first quarter 1988) shows a decline of 1.3 percent. All four variables were down from the previous year. Annual decreases of 7.2 percent for sales and use tax collections, 6.6 percent for the industrial index, 2.6 percent for total covered wages; and 0.5 percent for total employment led to the overall decline. Annual results for components of the industrial index were as follows: The oil drilling rig count was off by 51.9 percent, gallons of motor fuels plus gasohol sold decreased 0.9 percent; and the agricultural commodities price index increased by 7.7 percent. The healthy increase in the agricultural commodities price index was the only bright spot in the first quarter WCII.

Quarterly Comparison:

On a quarterly basis, the first quarter 1989 seasonally adjusted WCII did not change from the fourth quarter of 1988. The industrial index component also held at the same level as for the fourth quarter. Total employment was up 1.8 percent; while sales and use tax collections decreased 5.1 percent, and total covered wages decreased 1.5 percent. Within the industrial index the oil well drilling rig count was off by 27.1 percent from the previous quarter. However, this was offset by respective increases of 6.1 percent and 1.5 percent for the agricultural commodities price index, and gallons of motor fuels plus gasohol sold.

SECOND QUARTER 1989 WCII

Annual Comparison:

For the second quarter 1989 an annual comparison to the second quarter 1988 shows a 2.0 percent decline in the WCII. Once again all four component variables are down. The annual decreases are 7.2 percent for sales and use tax collections, 4.0 percent for total reported wages, 3.0 percent for total employment, and 2.7 percent for the industrial index. Annual results for the components of the industrial index show a solid increase of 9.1 percent in the agricultural commodities price index being offset by decreases

of 32.8 percent for the oil rig count and 4.1 percent for total gallons of motor fuel plus gasohol sold.

Quarterly Comparison:

On a quarterly comparison basis the second quarter 1989 WCII is down from first quarter 1989 by 1.3 percent even though three of the four variables increased. The industrial index is up 1.0 percent, total reported wages are up 0.8 percent, and sales and use tax collections are up 0.1 percent. These modest increases are offset by a decrease in total employment of 5.7 percent. The increase in the industrial index was led by a 31.8 percent increase in the drilling rig count. The agricultural price commodities index dropped by 3.2 percent, and total gallons of motor fuels plus gasohol sold dropped a negligible 0.3 percent.

SUMMARY

Overall the WCII shows some definite weakness for the first two quarters 1989 when compared to 1988. Back to back annual declines of 1.3 percent and 2.0 percent suggest that the economy is weaker than the year before. Though still within the stable range which has now prevailed for three full years since mid 1986, the WCII is currently at the lower bound of this range. On the positive side the drilling rig count rebounded some in the second quarter and three of the four WCII variables did increase in the second quarter over the first quarter. However the increases were small and were offset by significant weakness in total employment. The index warrants close watch in the near future to see if the conditions continue to weaken or if they will improve.

Early signals for the third quarter show continued weakness in sales and use tax collections. Collections for July and August are down 11.5 percent from the previous year. The industrial index is mixed at this point with the oil rig count down 12.3 percent from the previous year and the agricultural commodities price index up 3.8 percent based on July and August data. On a quarter-to-quarter basis the rig count is up 73.9 percent from the second quarter suggesting strong improvement, but the agricultural commodities price index is off 4.7 percent. In addition sales and use tax collections are off a negligible 0.2 percent from the second quarter.

It is important to keep in mind that the data series used in the WCII have been seasonally adjusted and also that the "total covered wages" and the "sales and use tax collections" series have been deflated using the U.S. Consumer Price Index. These data adjustments affect the raw data. The purpose of seasonal adjustment is to average out

seasonal fluctuations which occur in predictable patterns on a regular basis year after year. Once the data is seasonally adjusted any change in a data series between time periods gives a more accurate indication of actual changes in economic conditions. Similarly, by deflating data series which are in monetary units of measurement, a more accurate indication of "real" change is produced. As an example, even though actual sales and use tax collections for the first six months of 1989 are about the same as for the first six months of 1988, the purchasing power has declined from the previous year due to inflation. In effect "real" (in the sense of purchasing power) sales and use tax collections have indeed declined.

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Wyoming Department of Revenue and
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Active Oil Well Drilling Rigs (weekly): Oil and
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Total Gallons of Motor Fuels and Gasohol Sold (monthly): Wyoming Department of
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Division.

Wyoming Agricultural Commodities Price Index (monthly): Wyoming Agricultural
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Consumer Price Index - All Urban Consumers (monthly): U.S. Department of
Labor, Bureau of Labor Statistics.

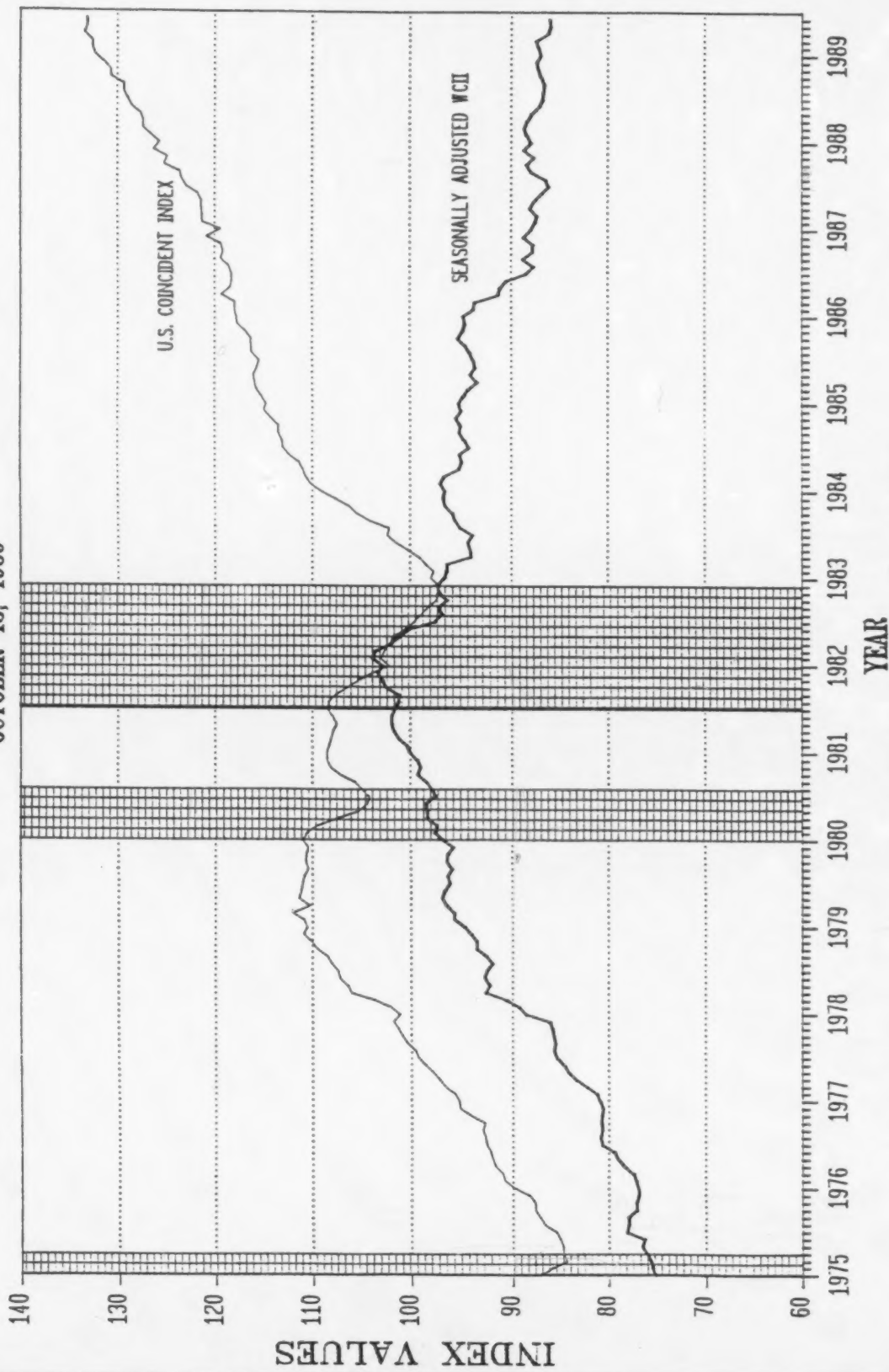
U.S. Index of Four Roughly Coincident Indicators (monthly): Business Conditions
Digest, U.S. Department of
Commerce, Bureau of Economic
Analysis.

Steve Furtney
Economist
Research & Statistics Division
Department of Administration and
Fiscal Control

Table 3

WYOMING COINCIDENT INDICATORS INDEX: JANUARY 1975 - JUNE 1989

OCTOBER 13, 1989



SHADED AREAS REPRESENT U.S. RECESSIONARY PERIODS.

Job Openings Outlook

SCHOOL COUNSELORS

School counselors assist with the educational, vocational, emotional, and social development of students. They work with students individually and in groups. Counselors help students gain a better understanding of their interests, abilities, and personality characteristics which help students reach their fullest potential by identifying personal strengths and weaknesses. They also assist students with school problems and with personal, social, and family matters. Counselors review test results, health reports, attendance records, and do advising and conduct seminars and workshops in the classroom. They may give tests and interpret the results for students, teachers, and school psychologists, and other school personnel. Counselors also maintain records and prepare clear and concise written reports.

School counselors must have above-average use of words and the ability to catch on to things. They must be able to coordinate the activities of others and to work as part of a team. Counselors must be able to deal with all types of people, and to establish good relationships with pupils, parents, and school staff. They must be able to help young people accept responsibility for their own lives. Counselors must be able to adjust frequently to different types of activities and to make decisions using personal judgment.

School counselors work indoors. Most have private offices, however, they may spend time in classrooms. Working more than 40 hours a week is common. Meetings often take place after school hours and in the evening. Most school counselors work 9 to 10 months a year with time off for school vacation. Most school counselors work in secondary schools. The rest work in elementary schools or community colleges.

A master's degree is required. School counselors must have a Wyoming Teaching Certificate and Education Specialists Certificate with a guidance counselor endorsement to work in public schools. Counseling programs are available only at the graduate level. Most programs include course work in occupational analysis, group and individual counseling theories and techniques, interpretation and use of tests in counseling, and developmental psychology. Some colleges suggest that individuals interested in school counseling get their teaching certificate and experience before entering counseling programs.

The employment of school counselors is expected to grow as fast as the average for all

occupations through the year 2000. School counselors average annual earnings is \$31,132.

EDUCATION ADMINISTRATORS

Education administrators manage the business and academic operations of schools and school systems. Administrators recruit and hire personnel, prepare and present budgets, and are responsible for the maintenance and development of school facilities and services. They plan and manage educational programs in cooperation with other public officials. Education administrators may work as superintendents of school districts, or as principals and vice-principals of elementary and secondary schools. They may also fill positions such as presidents of colleges, deans of students or deans of academic departments. Education administrators must be able to analyze problems, organize plans and ideas, make decisions, and respond to the changing needs of students and the community. Good judgment and willingness to accept responsibilities are necessary. The work is demanding and the pressure from community groups, parents, teachers unions, legislators, and civic organizations is considerable. Hours are often long and irregular. Most administrators spend many hours attending conferences and committee meetings, writing reports, or speaking to community groups and civic organizations. Educational administrators are employed by public and private school systems; colleges and universities. The minimum educational requirement for education administrators is a master's degree. For many university and college positions, a doctoral degree plus extensive administrative experience is necessary. Principals and superintendents are subject to board approval for hiring. Administrative experience is very important. An Education Specialist Certificate with administrative endorsement is required for principal and superintendent positions in elementary and secondary schools.

This is a medium-size occupation in Wyoming, employing about 680 education administrators. Wages vary with size of school and experience. Salaries for elementary and secondary principals range from \$30,000-50,000 per year. The average wage for elementary principals is about \$39,100 per year and for secondary principals about \$40,140 per year. Superintendents' salaries range from \$40,000-67,000 per year with the average around \$51,500 per year. University and college administrators' salaries range between \$30,000-76,000 per year.

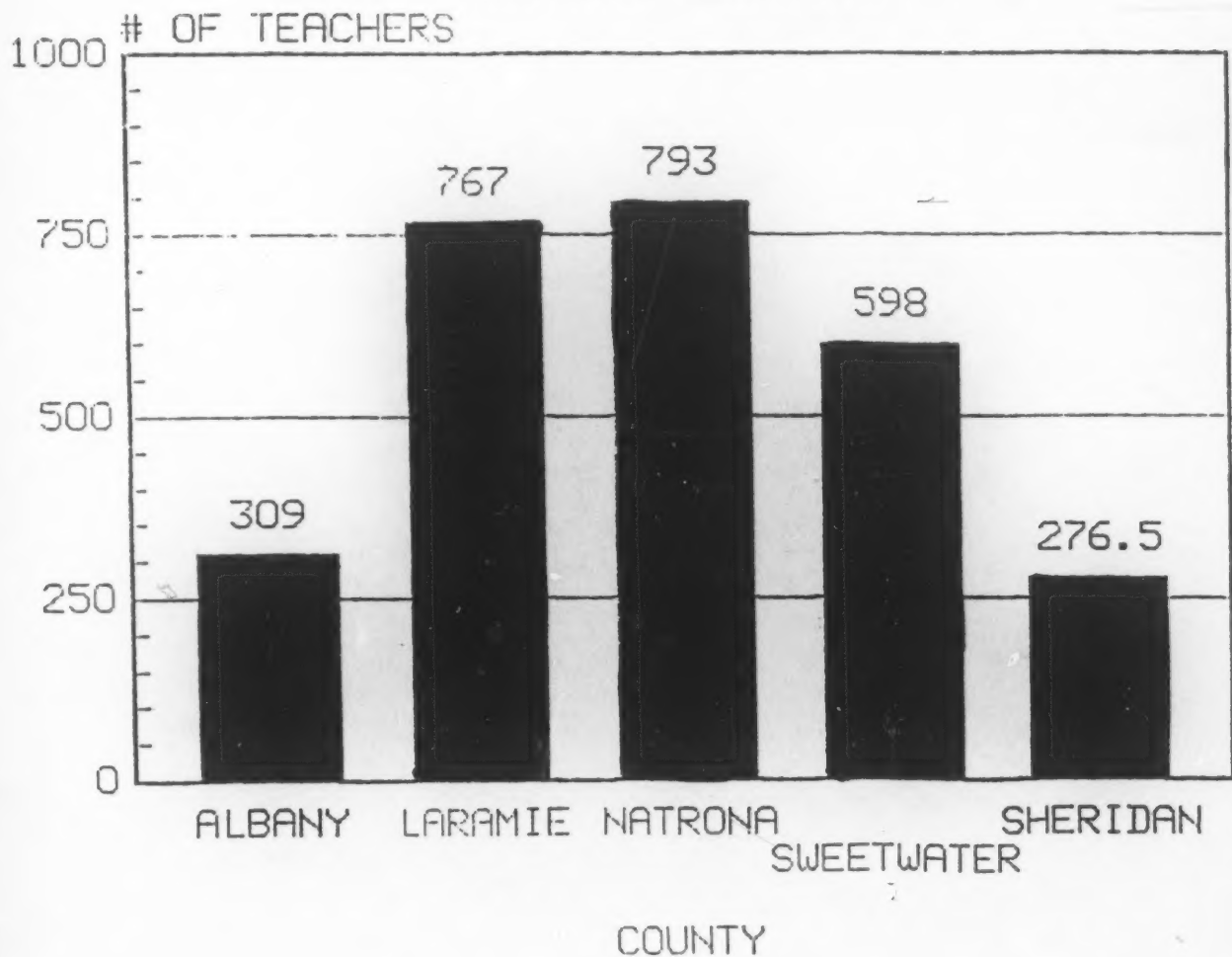
There is a slight surplus of qualified applicants in Wyoming. Outlook for these people depends on replacement of those who leave the occupation, size of student population, and public financial support. The need to replace some administrators who retire or transfer will create some openings. It is expected that there will be little growth in the number of administrative openings as schools struggle to keep costs from escalating. In addition, Wyoming's high pay scale for these positions has attracted many out-of-state applicants, resulting in stiff competition for available jobs. In general, studies forecast little growth due to budget limitations and increasing cost of educational services. Outlook

may improve if education services are expanded to include other groups in the community such as "pre-schoolers" or active recruitment and implementation of programs for the "older" student. Nationally, due to the consolidation of school districts and decrease in the total number of schools, some administrative positions are lost. However, some assistant positions will be created to deal with increased size and complexity of the consolidated units. Opportunities will be better for elementary administrators. However, competition is expected to be keen.

Suzanne McGuire
Research Assistant, WCIS

Feature Articles

NUMBER OF TEACHERS IN SELECT
WYOMING COUNTIES



The Future of Wyoming's Education

Both in Wyoming and in the nation we find ourselves now at a strange conjunction of circumstances and events that make adequate school funding critically important to the state, yet that also make it difficult to achieve.

First, the changing economy requires America to compete in the international market place. As you know, this is a fast-moving, diverse, information-driven environment. The people who participate successfully in this new economy must be quicker, smarter, and more agile than their competitors.

Although profound changes in the economy are rare, we have seen a similar upheaval in our past, the industrial revolution of the late 19th and early 20th centuries. Don't think it was any easier then. Schools which had been largely home and small rural enterprises had almost to be invented from scratch as families left the farms for the city, and waves of immigrants hit our shores. It was a confusing and turbulent time, very much like our own.

Nevertheless, eventually, and after great dislocation, we moved successfully from our agricultural economy to an industrial one. We did it by making profound changes in our lives, our institutions, and our society. Today we know we must make comparable changes, and nowhere more than in our schools where we still prepare students for that industrial society that is now all but gone.

If meeting the challenge of such profound change were not enough the schools face yet another challenge. Because of declining birth rates, there are fewer young people in relation to adults than ever before in our history. Just to meet workforce needs we must assure that every one of them can be a productive citizen.

Yet these young people have problems that are more serious than our children have ever known:

About a fourth live in poverty.

Over half of today's kindergartners will live in a single-parent household before they finish high school.

Nearly a fourth of the girls beginning school today will bear a child out of wedlock before they finish school.

By 1992 one in three of our children will be a minority.

Many of our children, poor and affluent, have serious problems of drug and alcohol abuse, eating disorders, abuse and neglect.

To make matters worse, poor, minority, and troubled children are the very ones with whom our schools historically have been least successful.

Finally, neither the federal nor the state government seems to have additional funds to address the problems.

Most educators and citizens agree that the schools must be more productive than ever before. That is, students must learn more, and what they learn must be different.

The term "restructuring" is frequently used to define changes that must occur. While there doesn't seem to be agreement about specific changes, generally people talk about the need for every student to have some common skills and knowledge. The State Board and Department of Education's Task Force on Education and the Economy, in a preliminary report, have identified some. For instance, every student should have highly developed skills and knowledge

- o in language: reading, writing, and speaking;

- o in math and science;

- o in culture and history of both the western and eastern worlds;

- o in foreign language;

- o in using the computer;

Students should, as well, have developed such values and attitudes as honesty and integrity, willingness to work, dependability, and concern for others. Most important, they should be able to think analytically and creatively; they should be adaptable and tolerant of change. All of these characteristics better prepare the student to be a successful and productive worker and citizen in a new and different economy.

The people who are wrestling with fitting a vision of tomorrow's schools with the emerging needs of employers talk about a student-centered setting where every child has an education plan that he, his parents, and teachers will follow. They talk about ungraded schools, especially in the early school years, where children proceed at their own pace.

Most believe that collaboration and cooperation will be essential in the workplace, and thus it must be modeled in the schools. Phil Schlecty, a Kentucky educator and student of restructuring,

says baldly, "Schools are the only and last place students will ever see adults working alone." Furthermore, he says, "Schools are the only place in society where people are organized by age."

Restructuring implies a different and more flexible use of time: shorter days and longer days--and combinations of days tailored to fit students and teachers and staff.

Restructuring implies a different use of facilities: the regular school site, to be sure, but also sites throughout the community--stores, parks, government buildings, offices, and factories.

As schools work with students so that they may learn more, better, and faster, they must use pedagogical methods that make learning an active, exciting process, that focus on individual development, that allow students to grow at their own pace.

At the same time, schools must deal with the problems of the family and society that students bring with them to school. A troubled child cannot learn. Our schools must be more inviting to parents, must welcome their active participation in their children's education.

I do not believe that reform of any kind, let alone the fundamental structural change our times call for, can be accomplished by fiat from the Governor, the State Superintendent, the President, the Legislature, the Congress--or even from local boards. Rather, all of these individuals and entities must do all they can to support grass roots efforts for change that emanate from local school districts, or, rather, and more importantly, from the teachers and principals in the schools themselves, and from parents.

It is toward these ends that the State Board and the Department of Education have worked for over a year to reconstitute Wyoming's standards for the accreditation of schools.

Through yet another task force, more than fifty teachers, districts and school administrators have fashioned some preliminary recommendations that focus state school accreditation less on compliance issues, as the current standards do, and more on learning outcomes--that is, focusing on the difference schools have made in a child's learning.

The state will lay out certain expectations--parent and staff involvement in planning, for example--; the school and district will establish the goals they expect students to meet, determine how those goals will be met, and evaluate how it worked.

Our present standards focus on such planning and evaluation processes in education as facility needs, curriculum development, and so on. The new standards take the logical next step and ask, "How did children's learning improve as a result?"

Accreditation will follow after evidence is shown not only that planning occurred, but also that students progressed. We expect and believe that these new standards will be a marriage, in the best sense, of local control and accountability.

Considering the public resources that schools expend, we cannot say too much about accountability. Schools should not be funded without also being accountable to the public for the funds spent. The schools must report more thoroughly to their communities than they do now. Very few citizens know how much, for instance, their school districts spend on each child, or how the students are performing, or whether their performance has improved over time. Citizens do not know how much effort the districts spend on handicapped children, or on troubled children, or on maintaining the physical plant.

Some districts now give their patrons a district report card--including just such information--Lander and Rock Springs, for example. Throughout the nation schools have discovered that they have nothing to fear from the public by giving them better information on what they are doing and how they intend to do it better. Even if matters are terrible. Schools must, however, report how they intend to improve--and then do so.

We are going into the next legislative session with both unparalleled expectations and unparalleled unity. For the first time since it was mandated, the Foundation Program Report of the State Board and the State Superintendent to the Governor and the Legislature will be disseminated before January 1. It is a carefully crafted document that is the product of months of work not only by the Board and the Department, but also by school board, administrator, and teacher representatives.

The centerpiece of the Report is the recommendation of a 5% increase in the CRU (Class Room Unit) value. We argue that since 1983 the schools have received one increase only--and that, just over 1%. They have been cut back two years of the seven, and they have lost \$11 million in construction funds.

During this time they have been required to be more attentive to children at-risk and to student health issues. They are expected now to change fundamentally. For that to be done, the people on the line--our teachers and principals, parents, too, need time to think, to reflect, to talk, to plan. They do not have time now.

We can ignore the immediate need to change. The schools will eventually evolve to become the institutions society needs. They have always done so. But if we want our youngsters--our Wyoming youngsters--to be able to hold their own in relation to youngsters from other states and from the rest of the world, I believe we must do more than business as usual.

Please don't misunderstand me. Our schools are not bad. They are wonderful; they are exceptional. Our schools are the envy of nearly every other state. I heard from people from all over the nation when the last Secretary's Wall Chart showed Wyoming's 17% increase in graduation rates since 1982. When the Wall Chart first came out, USA Today analyzed the data and determined two years in a row that Wyoming's schools were Number One. (That news was not reported in Wyoming, incidentally). But our schools are wonderful and exceptional and enviable for yesterday's world, not for tomorrow's. Although we are undertaking many reforms already, we must accelerate our rate of change, keep up with the changing society; and we must give our schools the wherewithal to do it.

Such an effort may require a reordering of legislative priorities, but nothing in state government is more important to Wyoming's long-term

success. America, and Wyoming along with it, will be relegated to third world status if our people are not the best educated in the world, not able to participate enthusiastically and successfully in the hurly-burly of the global workplace.

But we have always embraced challenge, as Americans and as citizens of Wyoming. We believe and have demonstrated that no task is too big to accomplish. Moreover, we have been willing historically to postpone today's pleasures for a better tomorrow. We have never devoured our seed corn. I am confident that together we will continue to respond in such a way. I am confident that we will make Wyoming schools equal to the challenges they face.

Lynn Simons
State Superintendent of
Public Instruction

Reading Instruction in Wyoming Schools

Visits to elementary schools reveal that Dick and Jane are nowhere to be found. Children still read small books but not with the characters familiar to parents. Instead children read a variety of materials ranging from stories that seem like rewrites of Dick and Jane to books written by authors in their room.

At one time the belief was that a single method could be found to help all children become readers. While some still subscribe to this idea, most teachers will say that no single method works for all children.

Beliefs about Phonics

The item most frequently distinguishing methods of reading instruction is the teaching of phonics. Phonics has been and continues to be the single most controversial issue. Few teachers argue whether phonics is important or not. The question is whether children need phonic knowledge before learning to read or whether being able to read to some extent is necessary to learn the appropriate use of phonics. The resolution of this argument in the near future seems unlikely.

A teacher's belief about the role of phonics determines how instruction will occur. A belief that reading is the decoding of sounds to letters leads to a specific sequence of instruction. Children are taught to associate sounds to letters and then blend these sounds into words. These words are linked to other decoded words to make sentences. Sentences are grouped into paragraphs to provide meaning for the selection. Phonics is considered the basic foundation for all reading. In this belief of the reading process, children must possess phonic skills before reading.

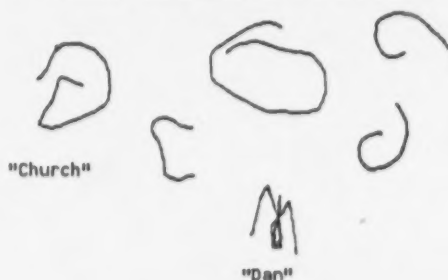
An alternative belief of the reading process is that reading is the construction of meaning rather than decoding letters to sounds. Constructing meaning incorporates the use of several sources of information one of which is phonics. An example of the different sources can be seen in decoding the word "wind". The sound for the "i" cannot be determined until the surrounding words have been understood. This is demonstrated in the sentences, "Be sure to wind the grandfather clock." and "The wind blew the boat." The meaning must be constructed before decoding can be finalized.

The construction of meaning belief draws support from recent research demonstrating that children as young as 2 or 3 have begun to learn about reading and writing. Observations of children indicate different types of scribbles for

drawing and writing as shown in Figure 1. In this piece from a boy 2 1/2 years old, the circular items were objects one of which he said was, "Church." The vertical lines in the center he said were his name, "Dan." At 2 1/2 years of age Dan knows letters are different than pictures. No instruction has occurred to teach about letters. By living in an environment containing signs of literacy, he has constructed this meaning on his own.

Figure 1

Writing and Drawing of 2 1/2 Year Old Boy



Another example of children constructing meaning is their reading before entering school. Preschool children astonish parents by seeing a McDonald's sign and "reading" it. They have constructed the meaning that the letters and golden arches signify a McDonald's restaurant is ahead. These same children will ask parents how to spell their names and to tell them what a billboard says. All this writing and reading occurs before any teaching of phonics.

Teachers that believe children construct meaning from the environment will provide many opportunities for learning about the world through reading and writing. In this instruction phonics is important, but no more than other factors as experience with print which might be reading labels from various foods or watching an adult writing a story children tell after a trip to the fire station.

Classroom Instruction

A visit to Wyoming's classrooms will reveal the existence of both beliefs regarding the role of phonics in reading instruction. One teacher will believe that phonics must be learned before children read and write while the teacher in the

adjacent room will believe children need to read and write in order to learn about phonics. The instruction in the rooms will differ.

A room where phonics knowledge is considered essential prior to successful reading will often have a basal reader as the major material for instruction. Dick and Jane was the classic example of a basal reader, but current materials have changed. Children still have a book they call their reader and usually a workbook to accompany it. The teacher has a manual providing an abundance of suggestions for using the materials.

Instruction in these rooms varies, but typically children will be divided into three ability groups, high, middle and low. The teacher will spend 20 to 30 minutes a day with each group introducing a selection, discussing some aspect of it and perhaps oral rereading a portion. Children spend 40 to 60 minutes doing independent activities as pages in the skills workbook, related writing tasks as creating a new ending to the story, and reading books from the library they have chosen.

Past editions of basals have been criticized for having poor literary quality, an overemphasis on isolated skills, and a lack of extended time for writing. Recent revisions of basal series with copyrights of 1989 and 1990 have reduced these criticisms. Unfortunately, the financial situation in many Wyoming school districts has forced the continued use of older editions containing weaknesses.

Most surveys examining the use of instructional materials indicate that 80 to 90 percent of elementary classrooms use basals. Thus, most children in Wyoming learn to read in these readers.

A number of teachers in Wyoming have chosen to move away from basal instruction. These teachers believe that phonic skills are important, however, they prefer using other materials for instruction. Most often these materials are literature books written for children.

In some communities these teachers call their instruction a "whole language approach" while other teachers call it "literature based". Whatever the name, the emphasis is on children listening to stories, talking about stories, reading stories, and writing stories. In these activities children learn the skills of reading and writing while actually reading and writing rather than learning the skills and then reading and writing.

Instruction varies considerably in whole language and literature based classrooms. A description of a first grade class will provide a sense for the atmosphere in these rooms.

An observer might see the teacher reading a literature book to the entire class. Following the reading, the class would talk about the story deciding why the author wrote it and whether events

in the story ever happened in their life. A group story would be told by the children and written on a large tablet by the teacher. The class would begin drawing individual pictures to go with the story. Then a group of children of differing reading ability levels would meet with the teacher as the rest of the class continued drawing. Teacher and children would reread the story written by the children. Pairs of children would read it to each other. The teacher then would give instruction on appropriate phonic skills using words from the children's story.

The next day the teacher would make copies of the children's story so each child could make a small book using the copy and the picture drawn the previous day. During that week the children would practice reading the story to each other. At the end of the week, each child would read it to a child in the kindergarten class.

Throughout the week the teacher would meet with small groups of children of differing reading abilities. As a part of the group sessions the teacher would decide which phonic skills should be taught and using words from the story help children learn and review the skills.

The type of instruction given to Wyoming children may vary considerably between schools in a community and even between rooms of the same grade within a school. In one room children might read basal stories while in the next room children were reading literature books. All reading instructional procedures have been successful with some children and all have failed with some children. No perfect system has been found.

Evaluation

In order to determine the effectiveness of the various instructional procedures, teachers measure children's growth in reading. This measurement may be called "testing", "assessment", or "accountability" and conducted in different ways.

Most Wyoming schools administer standardized tests in order to compare results with a nationally normalized group. In these comparisons Wyoming districts usually score around the 60th percentile. While this score is high, the fact that Wyoming has no major inner city population tempers the impressiveness of the score.

Standardized tests have changed little since first published over 50 years ago. The types of tasks children are asked to do have not changed substantially. To measure reading comprehension, children still read short selections and answer multiple choice questions.

Standardized tests have been roundly criticized for failing to change methods of measurement. Large scale projects are underway in Michigan and Illinois to develop new tests that

consider the child's background knowledge, ability to predict content of a selection, ability to read longer selections, and ability to know what to do when confused while reading. These new tests hold promise, but are still limited to judging a child on the information collected in an artificial setting over a short period of time.

One change in determining children's reading growth is the increased use of teacher assessment. Rather than relying on standardized test scores or brief tests provided by publishers of basal series, some teachers develop files or portfolios containing each child's work.

A portfolio includes writings related to selections that were read, anecdotal comments written by the teacher, a list of library books that were read, and results of an interest inventory. Some teachers place audio tapes of the child's oral reading in the portfolio.

Figure 2

THIRD GRADE POST READING OF SADAKO, APRIL

Candace: This was a true story. From epilogue.

Natalie: It Was?

Didn't understand.
Had she read?

Marcia: Of course, didn't you
read the epilogue?

Literary
qualities.

Candace: I didn't like it though. I didn't want
her to have leukemia. One thing I thought was
really sad was at the bottom of the epilogue. "This
is our cry, this is our prayer, peace in the
world."

Personal, cause
and effect, text
to support.

Marcia: I think that's probably the main part of
the book, the theme.

Inferential, main
idea.

Teacher: Why do you think E. Coer wrote the book?

Dan: To remember Sadako and her courage.

Author's purpose.

Sarah: To honor her memory.

Inferential, main
idea.

Other teachers tape record a group discussion and transcribe the tape. Transcriptions provide detailed information as to the level of contributions made by children. Figure 2 is a transcription from a third grade classroom discussing a book entitled, Sadako and the Thousand Cranes. This story describes a young girl in Hiroshima who contracts leukemia due to the bombing during World War II. The teacher has typed the comments made by each child and then noted the level of comprehension demonstrated.

An examination of the transcript reveals the sophisticated understanding of the children. Normal testing procedures do not allow children to show their depth of comprehension.

Kathy: Well, her classmates folded the rest of the cranes because they wanted to remember and honor her.

Detail and
inference.

Marcia: And they buried them with her like the Indians in Nya Nuki. It was their tradition and we know they had lots of those.

Link w/other
literature

Cal: She wanted to tell the world about a very brave little girl. And maybe what problems the bomb caused.

Inferential bkg
knowledge

Candace: That's probably why she included the verse that's on Sadako's statue, "Peace in the world..."

Inferential, cause
and effect.

Dan: Maybe she hopes the sad story will make people think about war.

Inferential

Cathy: Maybe she wants to help others who are sick.

Inferential

Marcia: The book was sad and made me cry but it was a happy sad, not a boo hoo sad.

Comparison-cause
and effect.

Information in the portfolio is used during parent conferences to illustrate the ability and growth of the child. Samples of work as the transcription from Sadako demonstrate a level of comprehension not available in a statement based on a standardized test such as, "Your child scored at the 68th percentile."

Closing

Reading instruction in Wyoming has changed and will continue to change. Children are reading more selections of quality literature in the newest editions of basals and in literature based instruction. Children are writing more often about their reading and writing longer pieces. Evaluation of reading will continue to use

standardized tests for comparisons, however, informal assessments by the teacher in normal classroom settings are increasing.

Dick and Jane are gone. The newest materials are of more interest and stimulate desire to read. In a Wyoming district that recently adopted a new basal series containing quality literature, a major problem with the materials appears to be a good omen. Librarians were concerned that increased numbers of children were checking out more books than ever before. The problem was that librarians did not have enough books to fill all requests. Not a bad problem to face in a television dominated society!

Edward E. Paradis
Professor of Curriculum & Instruction
University of Wyoming

"The Importance of Multicultural Education for Young Children"

Multicultural education for young children (up to age 8) is a way of teaching cultural awareness, a valuing of diversity, and creative thinking skills in a developmentally appropriate way. We know that this is a prime time for concept development in young children, and that children this age need concrete materials and experiences to help them learn best. Teachers of young children also know that a strong self-concept is central to learning. The teacher who uses a multicultural approach is validating all children and all families, and is providing children with important life skills.

What, then, is multicultural education? It might be easier to start with what it isn't.

1. Multicultural education for young children is not a watered-down social studies curriculum. This would not be appropriate with respect to the young child's level of understanding of time and geography.
2. Multicultural education for young children is not a "tourist approach" where countries and peoples are only studied with respect to special holidays, or for a fixed period of time (a week or a month) before the teacher and class are "finished" with that culture and move on to the next one until all are "covered". This puts the cultures into isolation and can even increase unwanted stereotypes.
3. Multicultural education for young children is not having children dress up and "be" people of a particular culture. Cultural identity is not something which can be role-played the way an occupation can.

Instead, multicultural education is a way of insuring that a variety of cultures and viewpoints are presented every day, thus making every child feel that his/her culture and race is valued, and helping all children develop a healthy attitude toward differences rather than ridiculing or fearing them. True multicultural education is really anti-bias curriculum. It provides an environment where children feel comfortable and are encouraged to ask questions, experience materials at their own levels, and draw conclusions based upon their own experiences. In doing so, they will be exposed to questions of race, culture, physical handicaps, geography, values, and sex roles.

With these principals in mind, the University of Wyoming Child Care Center (UWCCC) devoted the 1988-89 school year to implementing a multicultural curriculum for their 3-5 year old children, most particularly for the four-year-olds. Funds were

obtained from a grant from the Wyoming Council for the Humanities, the Department of Home Economics, and from the Child Care Center to purchase multicultural materials, videotape and document in an annotated written form the curriculum model, and to present the curriculum to early childhood teachers throughout Wyoming. Multicultural awareness became the focus of staff training for the year, and Dr. Tom Smucker (as a humanities scholar) came to the Center and did culturally appropriate art activities with the children to coordinate with the children's literature being used.

During the year, the four-year-olds were exposed to quality, non-stereotyped children's literature; multi-ethnic persona dolls; multi-racial dolls in the housekeeping area; original problem-solving puppet plays (using animals and multi-ethnic puppets); maps, globes, and a children's atlas; the introduction of foreign languages (in this case, French and German, since we started with languages the teacher was familiar with and that families of the children use); the introduction of sign language; multi-ethnic, non-stereotyped puzzles and manipulatives; multi-racial flannel board faces and figures; culturally diverse music and movement activities; culturally diverse art and cooking activities; multi-racial posters and pictures; field trips, guest speakers, enrichment activities...all integrated into monthly thematic units.

Using a teacher-as-researcher approach, data was collected for the school year, including daily annotations on the children's reactions to the material being presented, daily curriculum plans, videotapes, tape recordings, photographs, samples of children's art work, and scores on the Preschool Racial Attitude Measure II (PRAM II) which was administered in September, December and April. Children were paired with same age and sex matches at the Child Development Center (more commonly known as Hitchcock House), which is also administered by the Department of Home Economics at the University of Wyoming. These children did not receive a multicultural curriculum, and were only given the three testings of the PRAM II. Although statistical analysis is still being done, the preliminary results seem to show that the children who received the multicultural curriculum exhibited a greater decrease in sex-role stereotyping over the course of the year, and stayed constant or slightly decreased racial stereotyping, while the other children showed an increase in racial stereotyping. It is too soon to be able to speculate on the generalizability of these results, or to be able to say that they were more than teacher-effects, but they do raise interesting questions for future study.

SAMPLE ONE-DAY LESSON PLAN
MULTICULTURAL CURRICULUM PLANNING GUIDE

Media	Learning Centers	Concept Time	Group Time
sign language			(Review) Mother, father, sister, brother, grandmother, grandfather
foreign language			Russian: grandma, grandpa, mother, father
persona dolls/ puppets	Multiracial baby dolls (in house-keeping)		
plastic family figures			
wooden figures (family & job)	Use wooden family figures including child in wheelchair in block area		
art activity			
foods	Cooking activity: braided egg bread		
world map/globe			Children's Atlas: Russia and United States (New York)
photos/posters	Posters of families around the world		
music	Tapes with books		
movement/dance			
housekeeping items	Empty food packages, pots and pans, wok, tortilla press, dress-ups		
multicultural/ multiracial books/ folk tales	Selected books on all family groupings in book corner	Flannelboard story of <u>The Mitten</u> (tell, then act out)	<u>The Keeping Quilt</u> by Patricia Polacco
guest speakers			
other	Marker easel, puzzles, construx, weaving boards, parquetry set, workbench, sand table		Hand-made quilt, talk about quilts they might have; plan quilt they will help make

Resources

- Brunson-Phillips, Carol. Nurturing diversity for today's children and tomorrow's leaders. *Young Children*, January 1988, pp. 42-47.
- Carter, Margie. Honoring diversity: Problems and possibilities for staff and organization. *Childcare Information Exchange*, January 1988, pp. 43-47.
- Contreras, Gloria. Irrelevance and bias in multicultural curricula: Toward an authentic curriculum. *Culture*, pp. 105-119.

Derman-Sparks, Louise and the A.B.C. Task Force. Anti-bias curriculum: Tools for empowering young children. (1989) Washington, D.C.: National Association for the Education of Young Children.

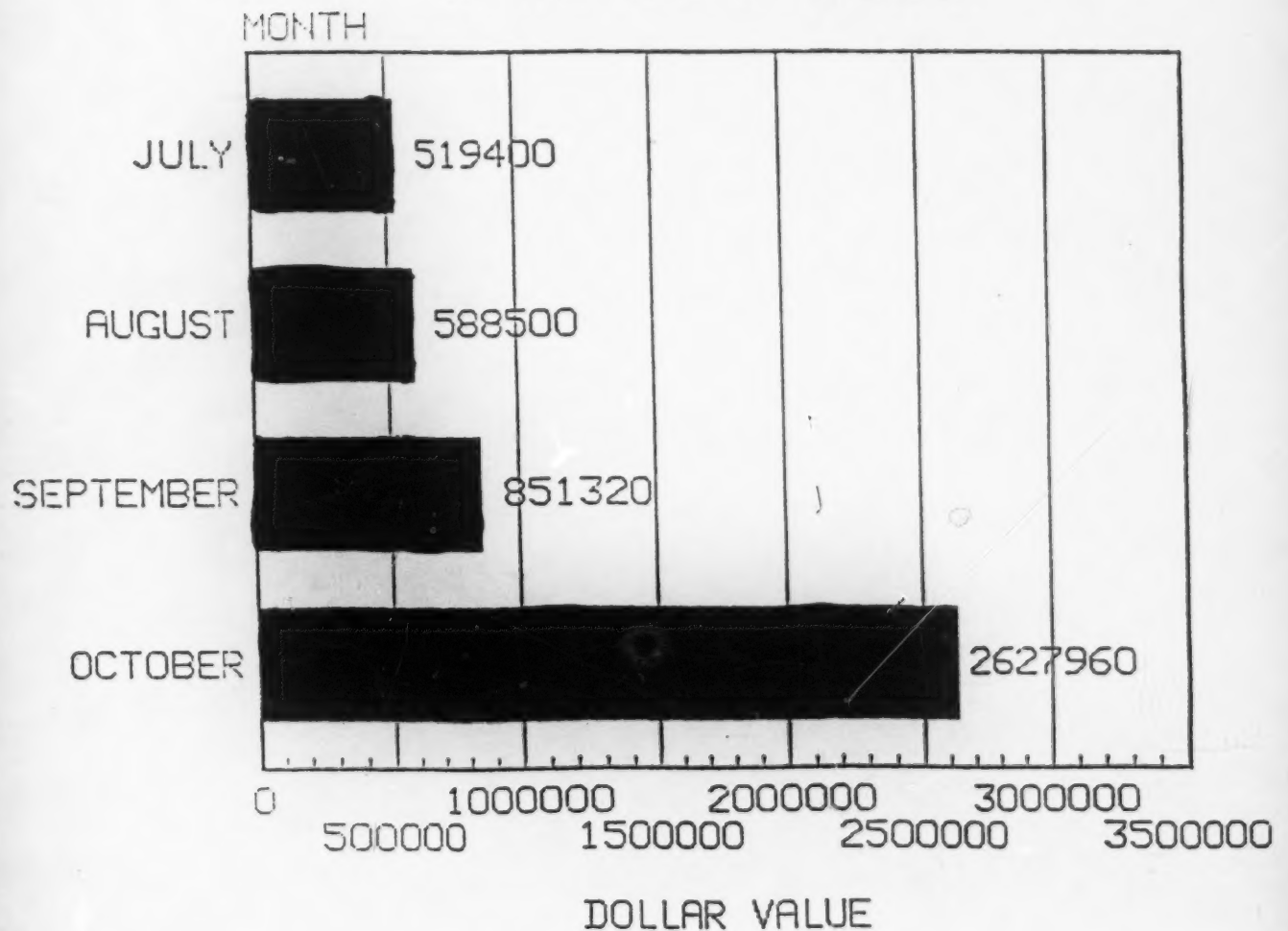
Milner, David. (1983). *Children and race*. Beverly Hills: Sage Publications, Inc.

Williams, J. E., Best, D. H., Boswell, D. A., Matson, L. A., and Graves, D. H. Preschool racial attitude measure II. *Educational and Psychological Measurement*, 1975, 35, 3-18.

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Economic Changes

VALUE OF AUTHORIZED CONSTRUCTION IN THE CITY OF JACKSON

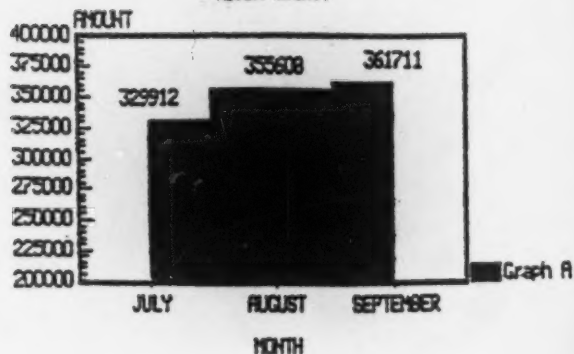


ECONOMIC CHANGES

The Wyoming Employment Security Commission has called Teton County Wyoming's pocket of prosperity stating in the October issue of Wyoming Labor Force Trends, "It appears that dependence upon tourism, where the Tetons are concerned, is a virtual guarantee of constant employment growth."

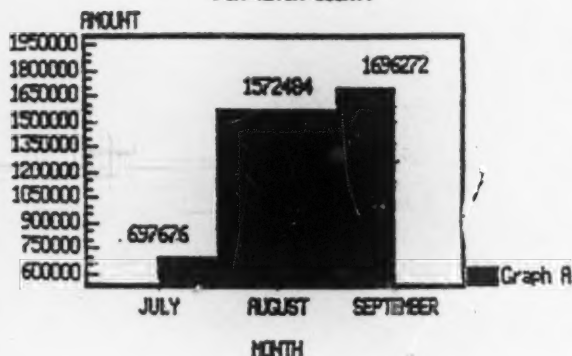
Presented in this issue are statistics for Teton County which are of interest in light of the above remarks and which are affected by tourism in the area.

LIQUOR SALES FOR
TETON COUNTY

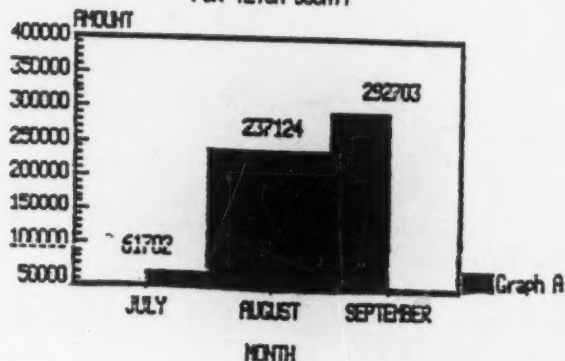


Teton County

SALES AND USE TAX COLLECTION
FOR TETON COUNTY



HOTEL, MOTEL, AND CAMP SALES TAX
FOR TETON COUNTY



State Data

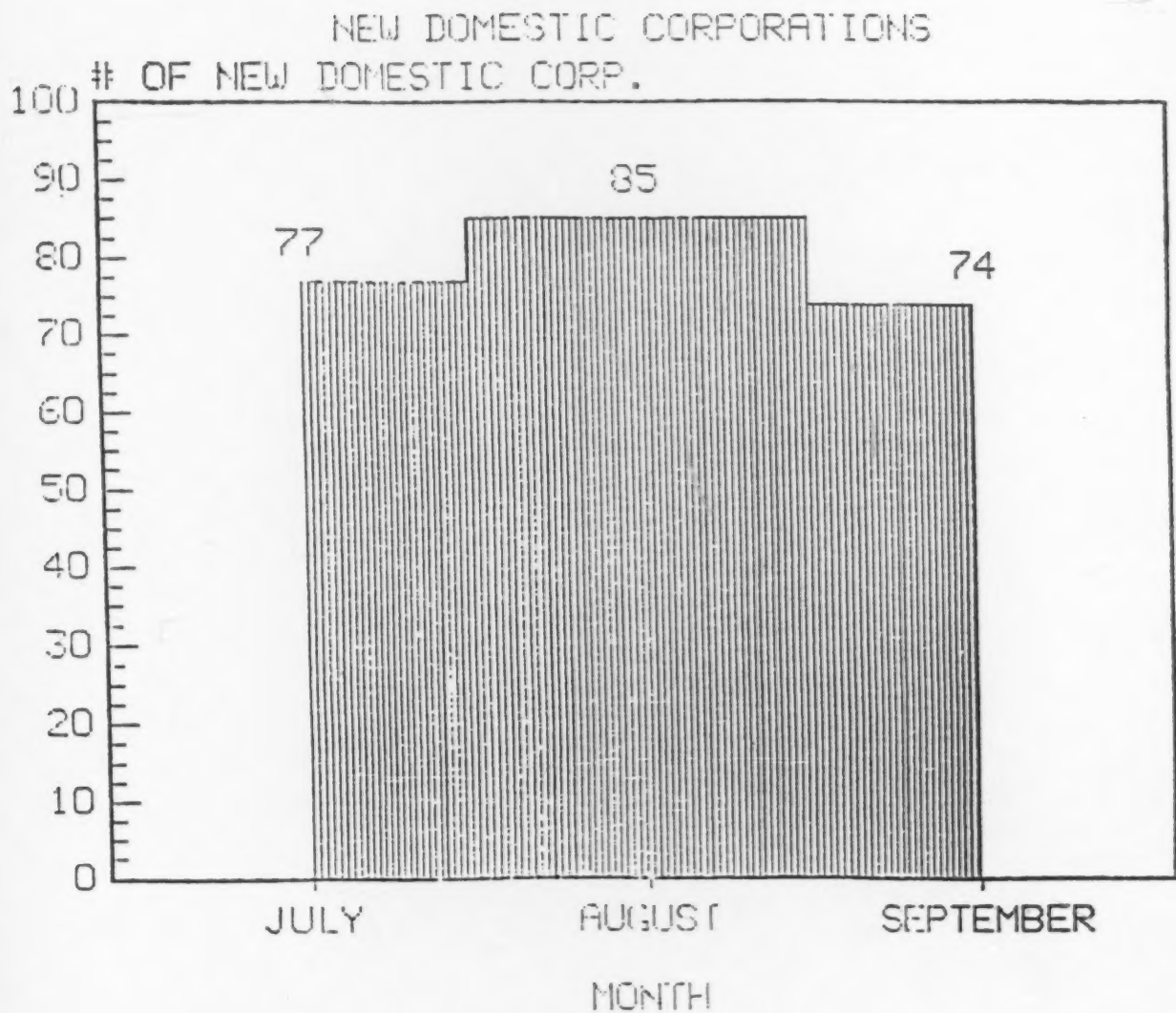


Table 4: Agriculture¹

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. Timber Cut in Wyoming National Forests (MBF)	42510.	47783.	25572.	20299.	75482.	28080.	5860.	39416.	54863.	23488.	6218.	37522.
Price Indices ² (1967=100)												
2. Wyoming Crops, Prices Received-Latest	208.	204.	209.	229.	218.	218.	244.	323.	310.	336.	336.	307.
3. Wyoming Crops, Prices Received-Average	215.	206.	207.	230.	218.	217.	234.	302.	312.	325.	335.	327.
4. U.S. Crops, Prices Received-Latest	190.	192.	210.	266.	216.	212.	249.	260.	261.	264.	263.	244.
5. U.S. Crops, Prices Received-Average	191.	192.	203.	223.	217.	214.	230.	262.	259.	265.	269.	250.
6. Wyoming, All Commodities, Prices Received-Latest	235.	261.	263.	304.	268.	301.	260.	313.	294.	314.	297.	308.
7. Wyoming, All Commodities, Prices Received-Average	241.	260.	268.	283.	273.	294.	280.	295.	304.	308.	305.	300.
8. U.S. All Commodities, Prices Received-Latest	220.	222.	237.	235.	232.	237.	253.	264.	265.	272.	267.	261.
9. U.S., All Commodities, Prices Received-Average	223.	222.	233.	234.	235.	238.	246.	263.	263.	270.	250.	264.
10. Wyoming Livestock, Prices Received-Latest	242.	278.	280.	327.	283.	325.	265.	310.	289.	307.	286.	308.
11. Wyoming Livestock, Prices Received-Average	248.	276.	286.	300.	289.	317.	294.	293.	301.	303.	296.	292.
12. U.S. Livestock, Prices Received-Latest	247.	249.	261.	201.	248.	260.	257.	268.	269.	281.	272.	276.
13. U.S. Livestock, Prices Received-Average	251.	250.	242.	241.	252.	259.	259.	264.	267.	277.	273.	276.
14. Prices Paid by U.S. Farmers-Average	321.	327.	331.	336.	335.	339.	348.	352.	354.	359.	361.	361.

¹First time readers of WQJ should refer to the "Format" page (in back) for an explanation of abbreviations and table formats.

²The index for the last month (latest) of each quarter, along with the average of the three monthly indices of each quarter.

Sources: Series 1: United States Forest Service. "Timber Cut and Sold, Convertible Products." Region 2 and 4 reports published quarterly.
Series 2-15: Wyoming Crop and Livestock Reporting Service. Bi-weekly Ag Statistics.

Table 5: Banking and Finance

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. Total Bank Loans and Leases Financing Receivables (T\$)	2003375.	1932753.	1931400.	1779168.	1765203.	1733754.	1787542.	1777474.	1758410.	1740029.	1793438.	INA
2. Total Bank Deposits (T\$)	3912276.	3741328.	3740737.	3688191.	3792473.	3671572.	3705311.	3712403.	3753325.	3623495.	3621158.	INA
3. Total Non-Interest- Bearing Deposits (T\$)	638317.	559803.	591011.	582741.	603809.	531243.	564608.	572367.	577610.	525702.	549281.	INA
4. Savings and Loan Mortgage Loans (T\$) ¹	787910.	810354.	812614.	794162.	772721.	744492.	740954.	726300.	711602.	719240.	696415.	410878.
5. Savings and Loan Deposits (T\$)	1148406.	1120110.	1104107.	1104332.	1137196.	1119558.	1107268.	1107961.	1070072.	1032814.	988180.	636685.
6. Prime Interest Rate ²	7.50	7.50	8.25	8.70	8.75	8.50	9.00	10.00	10.50	11.50	11.07	INA

¹Only members of the Federal Home Loan Bank Board are included. Indicates amount at the end of the quarter.

²Prime rate charged by banks on short-term business loans. Rate is for last month of the quarter.

Sources: Series 1-3: Office of the State Examiner of Wyoming, Abstract Report of State and National Banks in Wyoming, Published Quarterly.
Series 4 and 5: Federal Home Loan Bank of Seattle, Monthly Report. Comparative statistical analysis of member institutions.
Series 6: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 6: Business Conditions

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. New Domestic Corporations	307.	256.	270.	267.	254.	300.	298.	246.	221.	274.	302.	236.
2. New Foreign Corporations	217.	206.	232.	259.	229.	208.	196.	208.	232.	210.	249.	196.
3. Total New Corporations	524.	462.	502.	526.	483.	508.	494.	454.	453.	484.	551.	432.
4. Business Failures	64.	47.	72.	56.	53.	75.	52.	34.	32.	31.	30.	24.
5. Value of Business Failures (\$)	12405831.	2935220.	5896578.	5918282.	14181020.	11499022.	3906790.	28316376.	36551338.	3120102.	7852143.	3591064.
6. Personal Bankruptcies	340.	333.	359.	301.	308.	271.	351.	306.	306.	274.	336.	287.

Sources: Series 1-3: Secretary of State. New and Foreign Corporations. Monthly report.

Series 4-6: Cheyenne Credit Bureau. Wyoming bankruptcy cases, business failures, and value of failures. Weekly publication.

Table 7: Construction

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. New Residential Dwelling Units	317.	270.	458.	744.	297.	304.	449.	359.	292.	233.	294.	401.
2. Value of Residential Dwellings Constructed (M\$)	21.6	17.6	34.2	59.4	34.3	23.5	37.3	31.3	22.9	18.3	25.1	34.7
3. Value of Nonresidential Construction (M\$)	9.2	6.8	39.7	23.0	18.2	4.2	35.2	6.9	10.2	11.0	16.1	23.3
4. Building Permits Issued in Selected Wyoming Cities	2112.	1015.	2841.	3953.	2451.	1489.	2763.	2220.	2082.	1578.	2806.	2663.
5. Value of Authorized Construction (T\$)	20453.	9083.	23444.	24258.	13633.	15559.	25330.	21878.	18071.	8866.	24520.	22760.
6. Mortgage Interest Rate ¹	9.43	8.77	9.05	9.03	8.78	8.77	8.72	8.90	9.03	9.66	10.09	INA

¹Conventional first mortgage for new home purchase. U. S. average for last month of quarter.

Sources: Series 1-3: F.W. Dodge Division of McGraw-Hill. "Dodge Local Construction Potentials." Published monthly.

Series 4-5: Survey Research Center. "Local Construction Reports." Survey of authorized construction in selected cities conducted monthly.

Series 6: U. S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 8: Consumers

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. New Truck Registrations	2993.	2253.	3155.	3011.	3391.	2867.	3508.	3203.	3227.	3086.	3734.	3775.
2. New Car Registrations	2784.	2211.	3171.	3332.	3027.	2736.	3147.	2969.	2849.	2538.	3341.	3412.
3. Wyoming Personal Income (M\$)	6127.	6108.	6288.	6235.	6287.	6261.	6526.	6457.	6504.	6618.	INA	INA
4. U.S. Disposable Income (B\$)	3062.	3126.	3147.	3225.	3316.	3376.	3422.	3512.	3587.	3690.	3748.	2540.
5. U.S. Personal Income (M\$)	3590393.	3664374.	3722315.	3786079.	3902016.	3922767.	3994017.	4075042.	4198095.	4297169.	INA	INA
6. Latest U.S. Consumer Price Index (1982-1984=100) ¹	325.7	111.0 ²	112.4	113.8	114.2	115.1	116.7	118.5	119.2	120.8	122.8	123.2
7. Quarter's Average U.S. CPI	325.4	110.5 ²	112.0	113.3	114.2	114.8	116.7	117.8	119.5	120.2	122.4	82.1
8. Liquor Sales (T\$)	8811.	5421.	6673.	7616.	8379.	5679.	6714.	7041.	8368.	5530.	6747.	7269.

¹Number shown is for the last month of the quarter. CPI shown is the index for wage earners and clerical workers.

²Beginning January 1987, the consumer price index, previously expressed on a base of 1967=100, has been rebased to 1982-84=100. Selection of the 1982-84 period was made to coincide with the updated expenditure weights, which are based upon data tabulated from the Consumer Expenditure Surveys for 1982, 1983, and 1984. Historical data on the new base or additional information regarding these changes is available from the Bureau of Labor Statistics, Washington, D.C. 20212.

Sources: Series 1-2: R.L. Polk and Company Motor Statistical Division. "National New Vehicle Registration Service." Published monthly.
 Series 3,4: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published quarterly.
 Series 5,6,7: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.
 Series 8: Wyoming Liquor Commission. Sales data are reported to SRC.

Table 9: Employment and Labor¹

Calendar Quarters		4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. Civilian Labor Force		243637.	238819.	248444.	242054.	230684.	228734.	232589.	235250.	232159.	226172.	225615.	225475.
2. Employment		221405.	209316.	226738.	225635.	214312.	209923.	219454.	222072.	216417.	208738.	212474.	212137.
3. Unemployment		22233.	29503.	21707.	16419.	16371.	18811.	13135.	13178.	15741.	17434.	13141.	13338.
A. Unemployment Rate		9.1	12.4	8.7	6.8	7.1	8.2	5.6	5.6	6.8	7.7	5.8	5.9
5. Initial Claims Filed		14560.	13392.	8086.	6386.	9983.	10949.	6888.	5376.	9709.	10334.	6508.	4773.
6. Applications Received		10542.	10013.	11276.	9067.	9470.	INA	INA	INA	INA	INA	INA	INA
7. New Non-Agricultural Openings		7408.	4872.	9615.	9532.	8342.	INA	INA	INA	INA	INA	INA	INA
8. New Non-Agricultural Placements		7149.	4182.	8020.	7117.	8061.	INA	INA	INA	INA	INA	INA	INA
9. Miners' Average Weekly Hours		42.7	40.9	40.8	42.7	45.4	42.9	43.6	43.4	43.1	46.3	42.7	43.6
10. Miners' Average Weekly Pay (\$)		627.13	599.03	602.91	605.87	637.42	625.72	533.42	619.70	650.14	678.68	612.15	611.21
11. Miners' Average Hourly Wage (\$)		14.68	14.66	14.79	14.19	14.04	14.60	12.23	14.29	15.07	14.67	14.34	14.01

¹The most recent year's data are preliminary.

Sources: Series 1-11: Wyoming Employment Security Commission. Labor Force Trends. Published monthly.

Table 10: Energy and Mineral Production

<u>Calendar Quarters</u>	<u>4/86</u>	<u>1/87</u>	<u>2/87</u>	<u>3/87</u>	<u>4/87</u>	<u>1/88</u>	<u>2/88</u>	<u>3/88</u>	<u>4/88</u>	<u>1/89</u>	<u>2/89</u>	<u>3/89</u>
1. Wyoming Coal (TST)	36350.	35184.	33887.	39261.	38831.	37323.	39016.	42613.	42257.	39086.	40814.	37918.
2. U.S. Coal (TST)	222291.	222892.	219022.	226784.	246314.	231473.	225968.	239329.	258662.	241903.	238674.	216310.
3. Wyoming Oil (TSPD)	317.	310.	302.	310.	317.	320.	317.	306.	310.	309.	302.	296.
4. U.S. Oil (TSPD)	8390.	8371.	8339.	8227.	8347.	8304.	8216.	8033.	8073.	7900.	7860.	7669.
5. Wyoming Natural Gas (MMCFD) ¹	1692.	1453.	1281.	1171.	1203.	1430.	1339.	1135.	1455.	1953.	INA	INA
6. U.S. Natural Gas (MMCFD)	46953.	50801.	45830.	44335.	49241.	50768.	46453.	44547.	48982.	50080.	46354.	INA
7. Active Rig Counts in Wyoming-Average	38.	23.	27.	47.	61.	40.	33.	43.	31.	20.	22.	43.

¹ Beginning with fourth quarter 1986, Wyoming gas includes carbon dioxide production.

Sources: Series 1,2,5, and 6: U. S. Department of Energy. Energy Data Reports. Gas data are from Natural Gas Monthly, and the Wyoming Oil & Gas Conservation Commission. Coal data are published weekly.

Series 3-4: The Oil and Gas Journal. U.S. and Wyoming Oil Production. Published weekly.

Series 7: Petroleum Information Corporation, Hughes Tool Company. Monthly Average Active Rig Counts in Wyoming.

Table 11: Government

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. Sales and Use Tax Collections (T\$)	51058.	39867.	39591.	44922.	47115.	42585.	42769.	49721.	46445.	41823.	42966.	53145.
2. Violent Crime ¹	269.	299.	325.	435.	354.	354.	371.	431.	308.	310.	278.	INA
3. Nonviolent Crime ²	4294.	3955.	4772.	5057.	4420.	3713.	4562.	4662.	3917.	3565.	4423.	INA
4. Stolen Property (T\$)	2222.	1880.	2342.	2494.	2199.	1770.	1986.	2467.	2272.	2040.	2617.	INA
5. Stolen Property Recovery Rate	31.0	41.4	35.7	33.1	34.1	42.2	43.1	35.5	36.0	42.8	30.5	INA
6. Percent of Crimes Cleared ³	36.4	32.0	26.6	44.2	34.5	33.7	28.3	30.9	40.0	33.0	27.5	INA

¹Murder, negligent homicide, forcible rape, robbery, aggravated assault.

²Burglary, larceny, auto theft.

³Clearance of a crime indicates resolution of a complaint by arrest or other extraordinary means.

Sources: Series 1: Wyoming Department of Revenue and Taxation, Sales and Use Tax Division. "Net Collections by Business Class by County." Published monthly.
 Series 2-6: Uniform Crime Reporting Center for Criminal Justice Research, Division of Criminal Identification, Office of the State Attorney General. "Crime in Wyoming." Published quarterly.

Table 12: Tourism

Calendar Quarters		4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
<u>Visitors, National Parks and Monuments</u>													
1.	Yellowstone	124314.	75835.	681163.	1692818.	168613.	83736.	649842.	1268270.	216076.	82542.	720021.	1316305.
2.	Grand Teton	196051.	141570.	535659.	1486479.	264932.	144982.	624400.	1083754.	223562.	211180.	665734.	1361210.
3.	Devil's Tower	16610.	8523.	92700.	215299.	17980.	7121.	109993.	222877.	20702.	8064.	120589.	229668.
4.	Fossil Butte	1152.	282.	5082.	13793.	1072.	286.	5894.	13838.	1195.	224.	5565.	13192.
5.	Fort Laramie	3863.	1305.	35117.	50167.	4437.	1172.	24384.	49631.	4145.	1475.	20488.	40697.
6.	Big Horn NRA-South ¹	40878.	22056.	55064.	70305.	40782.	30045.	60727.	58820.	35558.	14293.	47417.	62160.
<u>Other Tourism Indicators</u>													
7.	Traffic Count (Avg. number of Vehicles/Day)	91685.	78349.	116920.	163546.	113385.	88529.	142830.	178675.	118023.	113409.	146663.	184209.
8.	Hotel, Motel, and Camp Sales Tax (TS)	1364.	928.	891.	1821.	1871.	947.	1050.	2106.	1929.	954.	1013.	1962.
9.	Gasoline Sales (TGL)	68488.	56561.	79620.	98146.	71190.	62295.	81811.	96106.	70784.	61807.	78869.	INA

¹ Big Horn Canyon N.R.A. is only partially in Wyoming. Only visitation for the Wyoming part is shown.

Sources: Series 1-6: Monthly visitor use reports of the National Park Service.

Series 7: Traffic Survey Unit - Planning Branch, Wyoming State Highway Department. "Selected Recording Stations Traffic Counter Data."

Published monthly.

Series 8: Wyoming Department of Revenue and Taxation. "Sales and Use Tax Summary by County by SIC Major and Minor." Reported monthly.

Series 9: Petroleum Association of Wyoming. Monthly Gasoline Gallonage Report.

Table 13: Utilities¹

Calendar Quarters	4/86	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89
1. Residential Electric Connections	177613.	177091.	176113.	175745.	175879.	175896.	176333.	177122.	176457.	175841.	175589.	175485.
2. Residential Electric Consumption (TWH)	408558.	476965.	337943.	291941.	399068.	505669.	351036.	301098.	401776.	688891.	348577.	296588.
3. Commercial Electric Connections	33880.	33355.	33744.	33898.	33780.	33602.	33722.	33846.	33756.	33928.	33997.	34038.
4. Commercial Electric Consumption (TWH)	486495.	438712.	403123.	419465.	416675.	456190.	420630.	425495.	426766.	467697.	414902.	428705.
5. Industrial Electric Connections	2655.	2989.	2791.	2796.	2764.	2760.	2748.	2921.	2872.	2972.	3104.	3143.
6. Industrial Electric Consumption (TWH)	1708946.	1718924.	1587866.	1740306.	1819191.	1788103.	1815370.	1720051.	1847617.	1812799.	1923513.	1790624.
7. Other Connections ²	3030.	2801.	3201.	3195.	2680.	2965.	3690.	3899.	3404.	3349.	7440.	4573.
8. Other Consumption (TWH)	55088.	47998.	51328.	84447.	16355.	10451.	24283.	64994.	13221.	9051.	41364.	102572.
9. Residential Natural Gas Connections	75188.	75206.	74384.	73512.	72654.	74286.	73935.	90673.3	93300.	100074.	99535.	97665.
10. Residential Natural Gas Consumption (MCF)	2661644.	3840399.	1944656.	740699.	2274494.	4310738.	2042533.	826220.3	2521850.	5786697.	2436947.	871763.
11. Commercial Natural Gas Connections	6623.	6652.	6617.	6546.	6520.	6643.	6560.	8357.3	9398.	9422.	9289.	10514.
12. Commercial Natural Gas Consumption (MCF)	1125927.	1687452.	939284.	408459.	997247.	1939461.	957241.	475106.3	1349515.	2981071.	1283967.	631348.
13. Industrial Natural Gas Connections	95.	98.	93.	88.	87.	88.	90.	90.	78.	85.	82.	80.
14. Industrial Natural Gas Consumption (MCF)	1770920.	1129556.	601308.	508551.	828532.	3249154.	482088.	2324709.	2504087.	3069267.	1977830.	2279086.
15. Other Natural Gas Connections	37.	37.	37.	38.	35.	39.	36.	35.	34.	36.	36.	34.
16. Other Natural Gas Consumption (MCF)	132.	170.	1225.	7352.	6988.	12922.	1920.	7488.	232.	1216.	4344.	10405.

¹Some small utilities do not report, hence the data are slightly less than actual state totals. The data are consistent. The same utilities' reports are included in each figure.

²"Other" includes agriculture, municipal, and other public.

³Starting with third quarter, 1988, the figures for Residential and Commercial Natural Gas Connections and Residential and Commercial Natural Gas Consumption reflect the merger of Northern Gas Division, Northern Utilities Division, and Northern Mountain Gas Company now doing business as Northern Gas of Wyoming.

Sources: Series 1-16: Reports to SRC by selected electric and natural gas utility companies. Survey conducted monthly.

FORMAT

For data available at least quarterly, the last 12 quarters are printed in WQU. In this edition, published series begin with the 4th quarter of 1986, and end with the 3rd quarter of 1989. For other data series (primarily annual), the most recent observations, up to 12, are published in WQU. Quarters are calendar quarters. For example, the 4th quarter is composed of October, November and December. In the table headings and narratives, a particular quarter will be indicated by notation such as 4/86 (4th quarter, 1986), 1/87 (1st quarter, 1987), and so on.

Beside each data series name is an abbreviation in parenthesis. The abbreviation indicates the units (such as dollars, tons, feet, miles, etc.) of the data. The key to the units abbreviations is below.

Throughout WQU, all data are for the State unless otherwise stated. The most recent year's data should be viewed as preliminary, due to revisions. The acronym "INA" signifies that information is not available.

The reader should be attentive to the footnotes at the bottom of pages, particularly those accompanying a data table. The footnotes help the reader to properly interpret the data, and they also indicate when more detailed (by subject or by area) data than that which is shown is available from SRC. A list of sources follows the footnotes.

Key to Units Abbreviations

MBF - Thousand Board feet	CWT - Hundred Weight
KWH - Kilowatt Hours	ST - Short Tons
TKWH - Thousand Kilowatt Hours	HST - Hundreds of Short Tons
\$ - Dollars	TST - Thousands of Short Tons
H\$ - Hundreds of Dollars	\$/ST - Dollars Per Short Ton
T\$ - Thousands of Dollars	HBBL - Hundreds of Barrels
M\$ - Millions of Dollars	TBPD - Thousands of Barrels Per Day
B\$ - Billions of Dollars	MCF - Thousand of Cubic Feet
GL - Gallons	HMCF - Hundreds of MCF Per Day
TGL - Thousands of Gallons	MMCFD - Million Cubic Feet Per Day

Subscriptions

Subscriptions to the Wyoming Quarterly Update are available for \$12.00 per year or \$3.00 an issue. Payment should be made to the Survey Research Center and mailed, along with name and address, to the address listed below.



The Survey Research Center

The Survey Research Center was established in the Summer of 1989. In addition to maintaining the data base used to publish the Update, the Center has the facilities, equipment, personnel and expertise to collect, compute and analyze survey data for both the public and private sector. The Center also serves as the Campus Affiliate Center of the State Data Center in Cheyenne and has information from the United States Census Bureau available.

For information about the Survey Research Center and its programs contact:

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--The Future of Wyoming's Education
Lynn Simone
State Superintendent of
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--Reading Instruction in Wyoming
Schools.
Dr. Edward E. Paradis
Professor, Curriculum
and Instruction
University of Wyoming

--The Importance of Multicultural
Education for Young Children.
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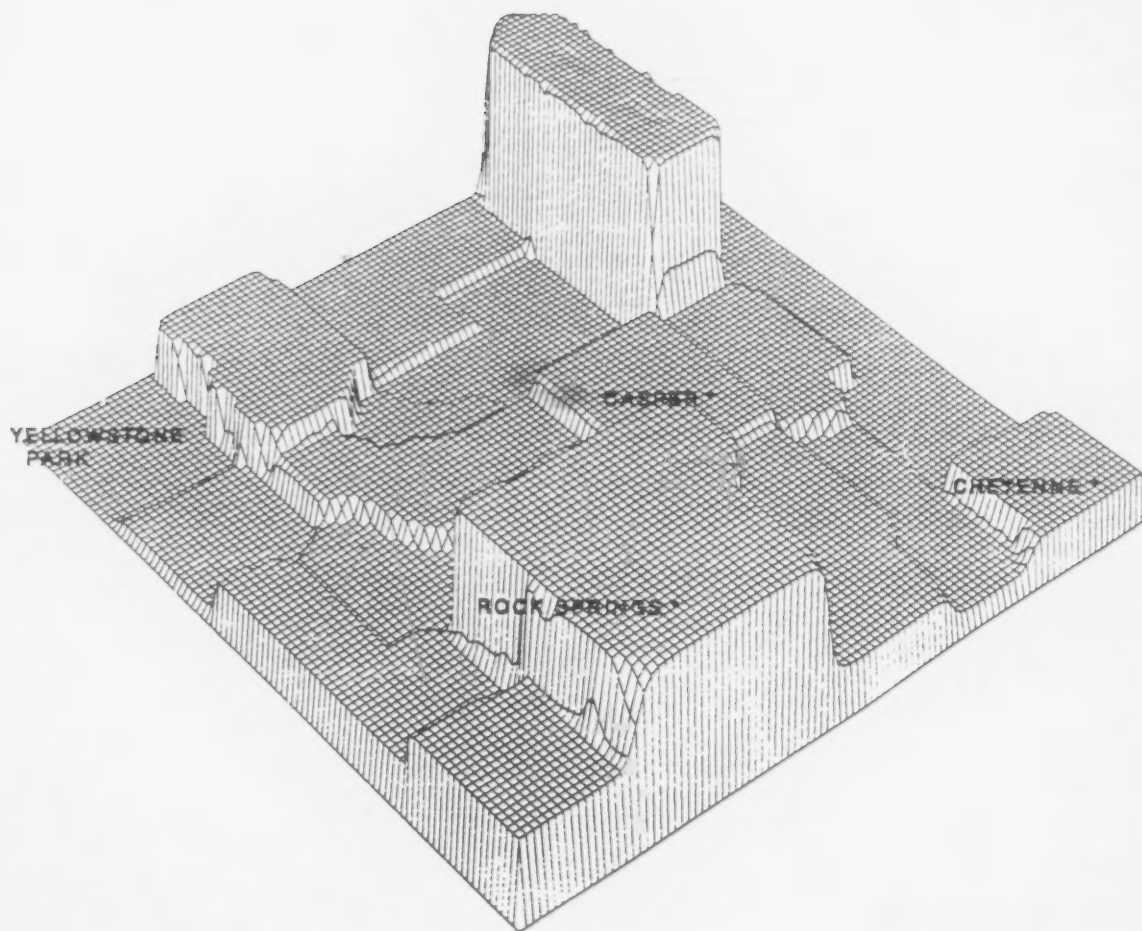
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WYOMING QUARTERLY UPDATE

WINTER 1990

Vol. 9, No.2



PERCENT OF ALL TAXES CONTRIBUTED BY COUNTY

BEST AVAILABLE COPY

SURVEY RESEARCH CENTER
DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF WYOMING

Wyoming Quarterly Update

Wyoming Quarterly Update (WQU) represents the efforts of the Survey Research Center at the University of Wyoming to provide improved data access services. The data presented in WQU are assembled from secondary sources, such as government agencies and private industry. The staff of SRC greatly appreciates the ongoing, helpful cooperation of each of the data sources.

WQU provides current indicators and timely, easily accessible data. Most of the data published in WQU are updated quarterly with the most current numbers. The complete data sets from which WQU originates are maintained, together with documentation by SRC. Readers are encouraged to contact the Center to find out how to gain access to data which do not appear in the WQU. Many data series, such as gasoline sales and taxation data, span more than 30 years. Numerous other series cover 20 years or more.

The cover of each edition features a contour map illustrating the geographic distribution of a particular variable. This edition presents the proportion of all taxes contributed by each county for the year 1989. Information for the map was obtained from the 1989 Annual Report of the State of Wyoming Department of Revenue and Taxation. See below for data used in the map. More information on Wyoming tax trends is provided in the Economic Changes section of this edition.

County	Percent	County	Percent	County	Percent
Albany	1.76	Hot Springs	1.55	Sheridan	1.81
Big Horn	1.62	Johnson	1.23	Sublette	2.48
Campbell	20.14	Laramie	4.83	Sweetwater	18.27
Carbon	4.89	Lincoln	5.06	Teton	1.48
Converse	3.71	Natrona	5.92	Uinta	8.52
Crook	1.46	Niobrara	.51	Washakie	1.16
Fremont	4.20	Park	6.00	Weston	.98
Goshen	.97	Platte	1.45	Yellowstone	0

First-time readers of WQU should refer to the "format" explanations on page 56 for keys on how best to use and interpret data presented in this publication.

For additional information, contact:

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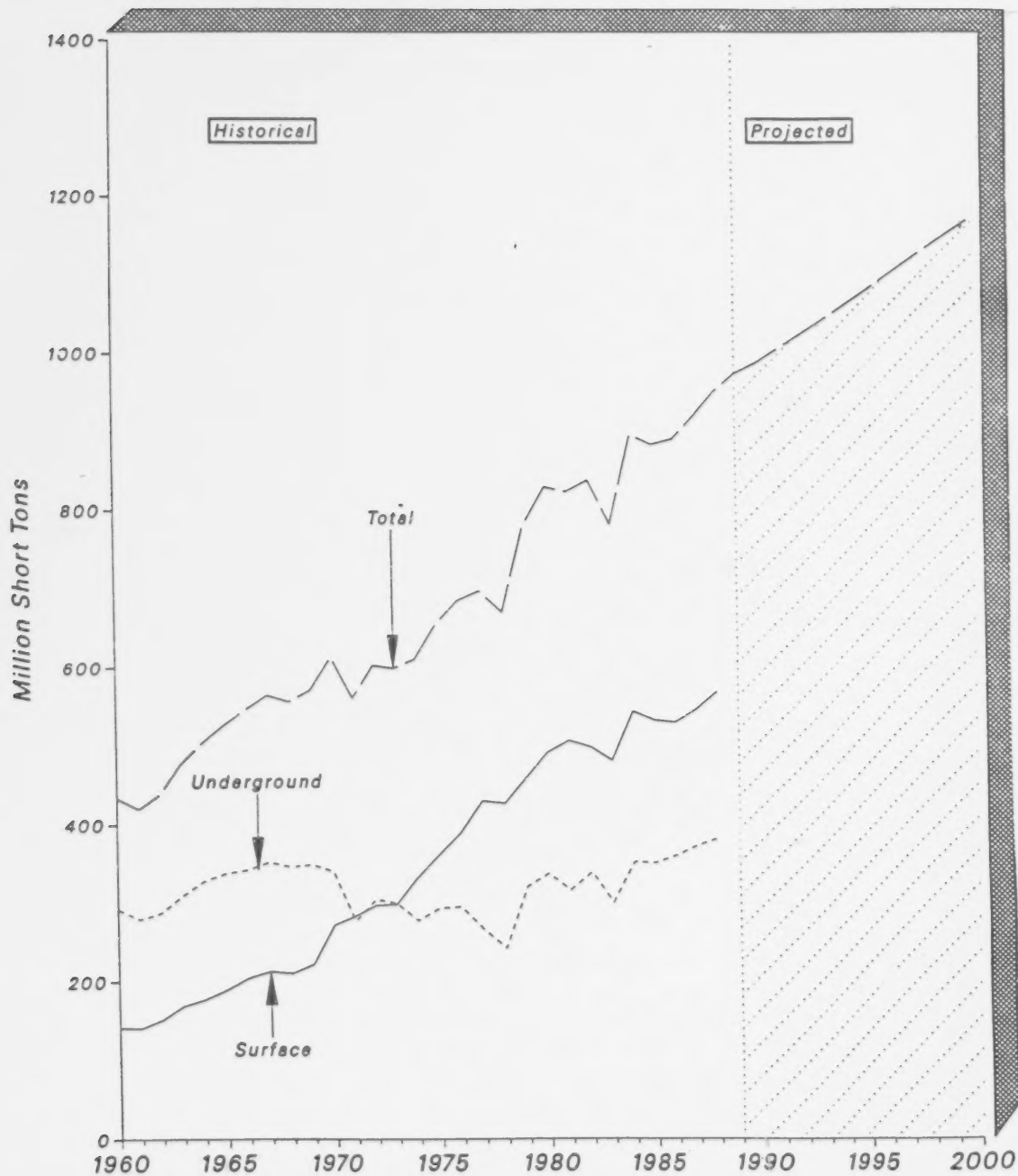
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Wyoming Scene

Coal Production Trends (For the United States)



Sources: Energy Information Administration, *Annual Energy Review 1988*; *Annual Outlook for U.S. Coal 1989*; *Short-Term Energy Outlook* (October, 1989); and *Coal Data: A Reference*.

Overview and Perspective

The end of the fourth quarter marked the end of the decade and the year ended on a positive note for the tourism industry. The National Park Service confirmed visitation totals for Devils Tower surpassed all other years. Visitors to the Tower totaled 358,853 in 1989, up from 347,451 in 1988. Similarly, the 1989 visitation totals for Yellowstone National Park indicate that visitors to Yellowstone are increasing. A total of 2,660,346 visitors through November 30th topped an old record set in 1978 of 2,623,141 for 12 months. According to a Wyoming Travel Commission survey done in September, this optimism is echoed by the travel industry in general.

This interest in the northwest corner of the state is reflected in the growth of the number of passengers embarking from Jackson Hole Airport. This number has risen consistently over the last decade and reached 138,000 through November of 1989. This surpassed the yearly total for 1988 of 130,634.

In related news, the October issue of Ski magazine published a survey based on the responses of 3000 of their readers in which Jackson Hole ski resort was ranked 7th overall among winter resorts. Resorts were ranked on challenge, terrain quality, snowmaking, ski schools, lifts, location, food, service, apres-ski and family programs.

Wyoming's tourism industry was not the only aspect that fared well in a national survey. A Money magazine survey showed Wyoming state and local taxes are among the lowest in the United States. Its ranking of 44th among the 50 states and District of Columbia earned Wyoming a spot on the ten

tax havens in the country. Wyoming's high ranking was due in part to the fact that the "Money" survey differentiated between taxes paid by mineral producers as opposed to those paid by individuals.

At year's end several positive trends appeared on the economic front. Sixteen of the 23 counties ended the year by posting lower unemployment over the year. The unemployment rate in October was substantially below the figure for October a year ago (5.2% compared to 6.0%), and figures indicate that 1000 more people were employed in October than in September. However, Wyoming still ranks ninth highest nationally in unadjusted unemployment.

In October Converse County had the highest unemployment rate at 7.1% while Goshen and Teton Counties shared the lowest unemployment rate of the 23 counties at 3.0%. Teton County lost its position as low county on the unemployment pole to Hot Springs County in November but led the state in labor force growth during that month.

By December Teton County was again number one in unemployment with a 3.4% rate. Fremont County had the highest unemployment rate for both November and December.

Teton County's economic trends have led the Wyoming Employment Security Commission to label it the Economic Crown Jewel of Wyoming. Teton County has gained workers every year from 1967 through 1989.

The number of new corporations increased from last quarter to 484. This

compares to 453 during the same period last year. The number of business failures remained steady at 25, down from 32 a year ago.

Figures coming out of Governor Sullivan's office indicate that while Wyoming was last in foreign exports in 1987, the State rose to 47th in 1988. This modest gain was enough to prompt hopes for further gains in 1989. The bulk of exports from Wyoming came from minerals and natural resources but about \$40 million (out of \$216.4 million) were from manufactured goods, machinery, and agricultural products.

As predicted in the last Update, the Bridger Teton National Forest management plan has set the stage for a battle between conservationist and the mineral industry. Both the Jackson Hole Alliance and the Wind River Multiple Use Advocates were planning on filing formal protests during a 90-day administrative appeal process late in January.

Preview of Coming Attractions

--An Omaha based telemarketing company should have opened offices in Cheyenne by the time this Update goes to press. The opening of SITEL Corporation should create around 150 jobs, 30 full-time and 120 part-time. Company officials are optimistic that the company will grow to accommodate more than 400 part-time employees after 3 years.

--The Department of the Interior has awarded Wyoming a \$1.7 million grant for a reclamation project in Fremont County. The grant money will allow for the reclamation of 2500 feet of high walls and approximately 100 acres of refuse.

--A \$129,000 federal grant was awarded to Lower Valley Power and Light in Afton. Money is for the "Super Good Cents Promotion Program" and will promote energy efficiency in new constructions and improvements.

--Coastal Corporation is planning to build a \$65 million plant in Cheyenne. The plant, which will produce a gasoline additive, will employ about 25 people full-time. Construction will take about 20 months.

Terry's Trivia

Did you know Chevrolet, Toyota, Chrysler, Busch, Coors Light, Dr. Pepper, Sears, and Glad Bags all used Jackson Hole locations to shoot commercials last summer? Three more companies, Jeep/Eagle, Artic Cat snowmobiles, and Nissan Pathfinder produced commercials in December.

Terry Haven
Editor
Survey Research Center
University of Wyoming

Winter Minerals Update

OVERVIEW

Perhaps the biggest news in the fourth quarter was the strength of oil prices. By the end of December, posted prices for Wyoming Sweet had gone over \$19.00 and the new year saw them topping \$20.00. The average posted price for Wyoming Sweet in 1989 was approximately \$18.26, up \$3.24 from 1988. If the price would stabilize above \$18.00 for a long enough time, some of the planned secondary and tertiary recovery projects in Wyoming might come out of their mothballed status. Since the average posted price exceeded \$18.00 in nine of the last 10 months of 1989, there is room for some optimism.

Our estimate of 108 million barrels of oil production from Wyoming in 1989 is still looking good (Table 1). Don Basko, Supervisor for the Wyoming Oil and Gas Conservation Commission, has estimated it a little higher at 108.65 million barrels. In either case, 1989 production will still be more than 5.5 million barrels below 1988. It would, however, take but a few new secondary or tertiary recovery projects to reduce the slope of this production decline.

There is also some good news regarding the price for combustible natural gas. The spot gas price at Opal has risen from \$1.05 earlier this year to \$1.65. This helps substantiate the opinion that the gas glut or bubble of the past is fast disappearing. This opinion is further supported by some spot shortages of natural gas that occurred in some parts of the country during the extremely cold days near the end of the year.

With the end of the gas glut in sight and the likelihood of a pipeline from Wyoming to California in the near future, it is not surprising that more than half of the rigs running in Wyoming in the last quarter were in the gas fields of the southwestern portion of the State. Admittedly, most of these rigs were not drilling exploration wells. They were drilling development or infill wells in or around existing fields. Still, they provided jobs and many proved up or developed existing reserves. Some even found new reserves.

It is still quite possible that the State's 1989 gas production will reach our estimate of 815 billion cubic feet (Table 1). On the down side, however, it may slip to as low as 810 billion cubic feet, which is about 1.6 billion cubic feet less than production in 1988. Only the year-end figures will answer this one.

In regard to coal, our predicted 170 million tons in Table 1 should be very close to the mark. The State's retention of its first place standing in coal production is about as sure as it can be before the actual figures are tabulated. In addition, potential markets for the State's coal were extended in the last quarter when a Kentucky utility company conducted a successful test burn of coal from the Powder River Basin of Wyoming. The utility is looking for a hedge against costly new pollution-control devices that might be needed to comply with anticipated Federal legislation regarding acid rain. On the down

side, the price paid for a ton of spot coal from the Powder River Basin still did not show any significant improvement.

Looking at other mineral industries of the State, iron production finished the year very strong as did production from Wyoming's one cement plant. Helium production remained stable as did the new burgeoning sulfur industry. Of the state's that produce sulfur as a by-product of natural gas production, Wyoming now ranks second. With the exception of uranium, most of the other mineral industries apparently held their own or increased production somewhat in 1989. Even uranium had an up side in that production from solution-mining operations increased again in 1989. Although the last of the conventional uranium open pit mines quit producing uranium in late 1989, the mine was not actually shut down. In anticipation of its reopening in the near future, the mine is still removing overburden from above the ore.

The bottom line is actually better than it was at the end of the third quarter because not only did the prospects for increased production of most mineral and energy resources occur, but also the price of oil increased through the end of 1989 and into the new decade.

Gary B. Glass
State Geologist
Geological Survey of Wyoming

OIL AND GAS UPDATE

Average posted prices for Wyoming Sweet crude oil rose from a low of \$16.40 per barrel in January, 1989 to a high of \$19.50 per barrel in April, 1989. After April, the

average monthly price fluctuated between \$17.35 and \$19.20 per barrel. The \$19.20 average price was for December, 1989. Prices were more stable in 1989 than in 1987 or 1988 and did not experience the sharp drop in the second half of the year that was characteristic of 1987 and 1988. While the average posted price for a barrel of Wyoming Sweet was \$17.98 in 1987 and only \$15.02 in 1988, it increased to \$18.26 in 1989.

Although OPEC met in November, 1989 and set a production quota of 22 million barrels of oil per day for the first half of 1990, Kuwait and the United Arab Emirates are expected to exceed their quotas. OPEC members want an average price of \$18 per barrel for their oil, which would translate into \$20-\$21 per barrel for Wyoming Sweet. It may be hard, however, to hold that price through the first half of 1990 because of the larger OPEC quota and anticipated increases in production from the North Sea.

The higher and more stable average prices for oil in the second half of 1989 were partly responsible for a relatively high rig count during the last four months of the year. Overall, the rig count averaged 34 for 1989. The average yearly count has been essentially flat for the past four years. The rig count should be higher in 1990 due to increased drilling for conventional natural gas as well as for coalbed methane. There is a chance, however, that this anticipated increase could be tempered somewhat if crude oil prices decline because of overproduction in other parts of the world.

There is an exciting new project in Wyoming that will use a single-well, cyclic, carbon dioxide (CO₂) stimulation (huff n' puff) process. The Enhanced Oil Recovery Institute (EORI) of the University of Wyoming is cooperating with Wold Oil

Properties Inc. of Casper to evaluate this process in Wyoming. The initial test well, the Crooks Gap No. 4, is located in Crooks Gap Field in NW SW section 18, T.28N., R.93W. The target for the project is the Dakota reservoir, which last produced oil in the Crooks Gap No. 4 well in July, 1966. Approximately 13.8 million cubic feet of carbon dioxide will be injected into the Dakota reservoir where it will be left to soak. After a three-week shut-in period, the well will be returned to production. If the well responds favorably, tertiary oil recovery may be in the range of 10,000-15,000 barrels of oil. - The well should begin production in early 1990.

The EORI also plans to test the process in other wells in different geographic and geologic settings. If even some of these tests are successful, the process could have significant implications for Wyoming's oil industry. There are several thousand abandoned and(or) marginally economic oil wells in Wyoming that are candidates for the huff n' puff process and the technique is well-suited to smaller operators who can't afford the costs of a CO₂ flood. The huff n' puff method may not only help recover millions of barrels of oil that otherwise might be left in abandoned wells, but it may also create an additional market for Wyoming's huge CO₂ reserves.

In a related item, the Interstate Oil Compact Commission reported that 17,423 stripper wells were abandoned in 1988 in the United States. Of that total, there were 327 stripper wells abandoned in Wyoming or 9.4 percent of the stripper wells in the State. Some of these wells would have been candidates for the huff n' puff process and may still be for that matter.

Exxon now owns a 60-percent interest in Hartzog Draw Field, the second largest oil-producing field in the State. Earlier they purchased Bell Creek Field in Montana. With the purchase of these two fields and Exxon's large carbon dioxide reserves, there is some additional optimism that Exxon might flood the fields with carbon dioxide in the not too distant future.

Activity in the Green River Basin continues to accelerate. In December, the Wyoming Oil and Gas Conservation Commission approved Amoco's application for an optional, additional Dakota gas well per section in the Bruff, Fabian Ditch, and Verne Fields in southwest Wyoming. The area is comprised of slightly more than 100 sections in T.17N., R.112W.; T.18N., R.111-113W.; T. 19N., R.111-113W.; and T.20N., R.111-112W. Amoco estimates that each optional well could recover an additional 2.2 to 4.0 billion cubic feet of gas.

In regard to coalbed methane, Quintana Petroleum recently staked five locations to test the Fort Union Formation less than two miles south of the Wyoming-Colorado border and about four miles southeast of Baggs, Wyoming. The tests are in West Side Canal Field which extends into southern Wyoming. Meridian Oil also drilled two tests for coalbed methane in the Fort Union a few miles west of the Quintana locations. No details are available yet on the Meridian wells.

In Sweetwater County, Wyoming, Triton Oil and Gas announced plans to drill a 4,000-foot test for coalbed methane from the Mesaverde Group in NW NW section 33, T.23N., R.102W. Triton already drilled two other tests to the Mesaverde in SW SW

section 9, T.22N., R.102W. and in C SW section 1, T.22N., R.102W. Buttonwood Petroleum drilled a 4,200-foot test of the Almond Formation in C NW section 32, T.23N., R.102W. There are still no details on these three wells.

The proposed Kern River Pipeline moved a step closer to fruition when a law judge for the California Public Utilities Commission (CPUC) gave it a favorable recommendation. In the decision, the law judge also endorsed the expansion of Southern California Gas Company's existing pipeline. One of the key points in the law judge's recommendation was that the Kern River project would diversify California's sources of gas supply. The Kern River Pipeline is designed to move large volumes of gas from southwestern Wyoming to California. The full CPUC, however, has still not chosen any particular pipeline to support. Their decision is expected sometime in January.

While estimates of Wyoming's proved reserves of natural gas and natural gas liquids both increased in 1988, an estimate of its proved crude oil reserves declined (Energy Information Administration, 1989). Although the Energy Information Administration's (EIA's) estimates of Wyoming's reserves of crude oil (815 million barrels) have only declined 3.1 percent since 1979, they have declined 14.3 percent in the last three years. If there had not been a drilling boom in the early 1980s, EIA's estimates of Wyoming's reserves of crude oil would be considerably smaller.

The good news is that EIA's estimates of Wyoming's proved reserves of natural gas and natural gas liquids increased substantially from 1987 to 1988. Estimated reserves of natural gas liquids (805 million barrels) are

over 15 times greater than in 1979 and increased by 16.3 percent between 1987 and 1988. Estimated reserves of combustible natural gas (10.9 trillion cubic feet) are 39.1 percent higher than in 1979, are 3.1% higher than in 1987, and are only 2.9% lower than the all-time high estimated in 1985. The 1988 increase in proven gas reserves, despite relatively few gas well completions and record gas production in 1988, indicates that Wyoming still has tremendous undeveloped resources of natural gas.

Lease sales did fairly well this year. Total revenue from State and U.S. Bureau of Land Management (BLM) sales exceeded the totals for 1987, but were down from 1988. The high per-acre bid at the October BLM sale was \$3,000 by Anderman Oils Ltd. for a 38.61-acre lease in section 24, T.24N., R.112W. The tract offsets a Dakota gas and condensate producer in Lincoln Road Field. Fourteen tracts in the sale received per-acre bids of \$100 or more: eight in the Powder River Basin, five in the Greater Green River Basin, and one in the Wind River Basin.

The high per-acre bid in the BLM's December sale was \$340 by High Plains Energy Co. for a 41.04-acre parcel in section 4, T.45N., R.71W. The tract is less than one mile west of Muddy Sandstone oil production in Hilight Field and is just east of a Minnelusa test being drilled by NICOR Exploration. Eight parcels in this sale received per-acre bids of \$100 or more. Four were in the Powder River Basin, one in the Bighorn Basin, one in the Wind River Basin, and two in the Green River Basin.

Two parcels received the high bid at the Wyoming Department of Public Land's November sale. Paul Sawyer paid \$170 per acre for a 320-acre lease which included SE

section 33 and SW section 34, T.54N., R.68W. The lease is less than a mile southwest of Minnelusa oil production in Lily Field. Brown Operating also paid \$170 per acre for a 40-acre tract which contained NW NW section 33, T.50N., R.71W. The lease is one mile east of Minnelusa oil production in AG Farm Field. No other tracts got bids of \$100 or more per acre.

Based on company data and on information compiled and published by Petroleum Information, the following significant exploration and development events occurred in Wyoming during the fourth quarter of 1989:

A. Texaco Inc. is drilling a 16,000-foot Frontier and Dakota in SE NE section 13, T.12N., R.116W. The well is about four miles northwest of Dakota oil production at Graham Reservoir Field.

B. Wexpro Co. has completed three more prolific gas wells in Church Buttes Field. Wexpro is in partnership with Union Pacific Resources in the development of this field. The 58 Church Buttes Unit well, completed in SW SE section 12, T.17N., R.112W., flowed 1.17 million cubic feet of gas and 15 barrels of water per day from the Frontier Formation; the 60 Church Buttes Unit well in N/2 NE section 23, T.17N., R.112W. was completed for 789,000 cubic feet of gas and five barrels of condensate per day in the Dakota; and the 56 Church Buttes Unit well flowed 1.18 million cubic feet of gas and 22 barrels of water per day from the Frontier in C NW section 16, T.17N., R.112W.

C. Lincoln Road Field has another good Dakota well. Thermal Exploration's 2-22 Lincoln Road well in NW NE section 22,

T.24N., R.111W. flowed 692,000 cubic feet of gas, .214 barrels of 54.4° API gravity condensate, and nine barrels of water per day.

D. Wold Oil and Gas completed a shallow pool discovery in Longs Creek Field, an abandoned Phosphoria field. The discovery well, the 3 Government-Hearney in NW NE section 5, T.31N., R.94W., flowed 346,000 cubic feet of gas per day from the Frontier Formation.

E. Amoco Production completed an 18,900-foot wildcat to the Morrison as a Lakota gas discovery. The 1 Frewen Deep Unit well was drilled in NE SE section 13, T.19N., R.95W. No details have been released except that the well will be shut in until a pipeline connection is made. Amoco has plans to drill two more deep tests in the area.

F. Sullivan and Co. plans to drill a 16,500-foot Tensleep test in NW SW section 12, T.22N., R.85W. in the Hanna Basin. The well is planned for the first quarter of 1990. Primary objectives of the well are the Sundance and Tensleep.

G. Austin Creek Field has a new Muddy Sandstone producer. The 1-12 Van Irvine Trust well in SE NE section 12, T.32N., R.85W. flowed 303 barrels of oil and 416,000 cubic feet of gas per day. Amoco acquired the Austin Creek properties when it bought Tenneco's Rocky Mountain Division last year. This is the third producing well in the field, which was discovered in 1988.

H. Notches Field, discovered in 1923, underwent a \$4.8 million development program during late 1988 and early 1989. Pacific Enterprises Oil Co. drilled thirteen new wells and 10 were completed as new

Tensleep Sandstone producers. The program extended the field to the south and west. Through the first nine months of 1989, production at the field, which is in T.37N., R.85W., stood at 426,065 barrels of oil. Production for all of 1988 was only 203,060 barrels of oil. This field provides a good indication of how much oil remains in some of Wyoming's older fields.

I. True Oil is drilling a 12,500-foot Minnelusa test on the western flank of the Powder River Basin in NW SE section 14, T.55N., R.83W. Arvada Field, 35 miles to the southeast, is a shut-in Minnelusa field.

J. Lario Oil and Gas pumped 172 barrels of oil during a 24-hour production test of the Minnelusa at their 11 Shepherd well in SW SW section 17, T.54N., R.67W.

K. Chaparral Resources discovered oil in the Minnelusa at their 1-A J.B. Hahn well in SE NW section 20, T.53N., R.68W. The initial pumping potential was 69.5 barrels of oil per day. The well was drilled about 100 feet north of the abandoned J B Field discovery. That discovery well produced 13,104 barrels of oil before its abandonment.

L. Lasmo Energy has discovered Superhornet Field in the Minnelusa and has drilled two successful development wells. The discovery well, the 1-15 Superhornet in NE SE section 15, T.50N., R.71W., averaged 531 barrels of oil per day during 26 days of production in September. The company also completed the 2-15 Superhornet in SW NE section 15, T.50N., R.71W. pumping 328 barrels of oil and 193 barrels of water per day. The 3-15 Superhornet in NE NW section 15, T.50N., R.71W. was completed pumping 768 barrels of oil per day.

M. Ampolex, Inc. completed their third Minnelusa well in W D Field. The 24-34 Federal in SE SW section 34, T.49W., R.71W. pumped 290 barrels of oil per day. Between August and its discovery in June, W D Field produced 20,423 barrels of oil.

N. Lasmo Energy has an apparent discovery in the Minnelusa. The 1-30 Appaloosa well in SW SW section 30, T.45N., R.72W. recovered 180 feet of 37° API gravity oil, 1,550 feet of gas-cut water-cushion, and 90 feet of gas-cut mud. This well, if economical, would be one of the most southerly producers in the Minnelusa trend of the Powder River Basin.

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COAL UPDATE

Production indicators during the last quarter of 1989 continued to show Wyoming's 1989 coal production substantially ahead of 1988's record production. Through September, reported coal deliveries from mines in Wyoming were about 7.8 million tons ahead of deliveries for the same period in 1988. The Energy Information Administration (1989) estimated that production from Wyoming mines through November, 1989 was about 3.2 million tons ahead of production reported for the same period in 1988. Projecting these two estimates to the end of 1989 (assuming that the average monthly production does not change) yields final coal production between 166 and 171 million tons. These estimates are consistent with the 170 million tons we predicted in late 1989.

As was noted in the Fall issue of Wyoming Quarterly Update, increased sales of coal on the spot market are apparently accounting for much of the increase in coal production in 1989. In the first eight months of 1988, 4.9 million tons of spot sales accounted for about 4.8 percent of total reported coal deliveries. By comparison, spot sales for the same period in 1989 totalled 9.1 million tons or 8.3 percent of all reported deliveries. In July and August of 1989, spot sales accounted for over 10 percent of the total coal deliveries. Our production forecast for 1989-1993 (see Table 1) remains unchanged from that made in October, 1989.

Projects to upgrade Wyoming coal were back in the news in the fourth quarter of 1989. In late December, the U.S. Department of Energy (DOE) selected Encoal Corporation, a wholly-owned subsidiary of Shell Mining Company (owned

by Shell Oil Company), as the recipient of \$36 million in Federal funds from round three of DOE's Clean Coal Technology Program. Encoal Corporation's project is a demonstration-sized coal processing plant that will convert 1,000 tons of coal per day to hydrocarbon liquids and upgraded coal. They will use technology that was recently licensed to TEK-KOL Partnership a jointly-owned venture between Shell Mining Company of Houston, Texas, and SGI International of LaJolla, California.

Encoal's plant will be located at Triton Coal Company's Buckskin mine north of Gillette, Wyoming, and will convert 8,300-Btu per pound, low-sulfur, high-moisture-content coal into a liquid similar to No. 6 fuel oil and into an upgraded coal with approximately six percent moisture and a heat value of about 12,000 Btu per pound. Encoal Corporation's plant is the only Wyoming project among the 13 projects selected in the third round of DOE's initiative for clean coal technology. Shell Mining Company will provide \$36 million of their own funds to match the Federal funds.

The K-Fuels project apparently progressed another step in late 1989 with the announcement that Smith Powerfuels would construct a \$50 million K-Fuel plant near Gillette in 1990. Smith Powerfuels is a partnership between Smith Cogeneration, Incorporated of Oklahoma City, Oklahoma, Energy American of San Diego, California (an affiliate of Occidental Petroleum), and K-Fuel Partnership of Gillette, Wyoming, and Denver, Colorado. The new plant is evidently a commercial version of the \$10 million K-Fuel demonstration plant that has been operating at the Fort Union mine north of Gillette. The new plant will convert two tons of run-of-mine subbituminous coal to one ton

of K-Fuel pellets. The pellets are characterized by their low-sulfur, low-ash, low-moisture and high-Btu content. The plant should produce enough pellets to support about a 1,000-megawatt electric-generating plant.

Wisconsin Power and Light Company has agreed, in principle, to purchase all of the plant's output. Although the cost of the fuel pellets is estimated at about \$40 a ton F.O.B. the plant, Smith Powerfuels believes the fuel will be in demand from older coal-fired plants (currently burning high-sulfur Eastern coal) that will be required to reduce stack emissions in response to acid rain legislation.

Also, several electric utility companies have recently announced that they will be conducting test burns of Amax Coal Company's dried coal product. Fremont, Nebraska Department of Utilities purchased 1,500 tons of dried coal to test in a 17-megawatt generating unit. If the burn is successful, the Department of Utilities could use from 25,000 to 30,000 tons of the dried coal as a peaking fuel (a higher quality coal added to a boiler to obtain full power to output), particularly in the event that their new coal supply contract is for Powder River Basin coal. The dried coal product shipped to Fremont's Wright generating station had a sulfur content of 0.3 percent, from 10 to 12 percent moisture, and a heating value of about 10,400 Btu per pound. The dried coal reportedly cost \$14 a ton F.O.B. Amax's Belle Ayr plant and \$24 a ton delivered (McGraw-Hill, Inc., 1989a).

Iowa Public Service Company announced in October that they would also conduct a test burn of Amax's dried coal product at their George Neal No. 3 generating plant when the product becomes available.

Developments in the Hanna Coal Field

Perhaps the biggest news in the Hanna Coal Field was Arch of Wyoming's announcement that the State's legislated tax breaks of past years had paid off at least for Arch. In 1989 the company employed 40 more people than in 1988 and production was expected to be about 1.2 million tons greater than in 1988, or 3.0 million tons. They anticipated hiring another 13 people late in 1989 or in early 1990. In fact, a company spokesman felt they were doing well enough that they were not even planning to ask the Legislature to extend the tax exemption that expires in 1991.

Developments in western and southwestern Wyoming

As a follow-up to the article about Arch Mineral Corporation's purchase of the Staßbury mine north of Rock Springs (see Wyoming Quarterly Update, Fall, 1989, p.8), Arch announced in November that they were hiring 35 to 40 persons to work at the mine in anticipation of a January, 1990 startup date. Production of bituminous coal from the underground mine, now called the Pilot Butte mine, will be sold to Pacific Power and Light Company's (PP&L) Jim Bridger power plant east of Rock Springs. Although no firm contract has been signed, the two companies verbally agreed on coal shipments of 25,000 to 30,000 tons per month to the power plant. The coal will be hauled from the mine to the plant by trucks.

In southwestern Wyoming, transporting coal by truck is gaining in popularity. Savage Industries currently hauls about one million tons of coal annually from the Black Butte coal mine to PP&L's Jim

Bridger plant; coal from the Pilot Butte mine will be hauled by truck (see previous paragraph); and most recently, Pittsburg and Midway Coal Mining Company (P&M) and Bonneville Transloaders, Incorporated (BTI) signed a coal transportation contract. The new contract calls for BTI to transport 500,000 tons of coal per year from P&M's Kemmerer mine to General Chemical Company's trona processing plant west of Green River. The coal will be transported by 40-ton trucks from a \$1.7 million truck loadout facility (to be constructed by P&M at Kemmerer) south on U.S. Highway 30 to Granger, and then east on U.S. Interstate Highway 80 to General Chemical's plant. BTI already does extensive hauling of soda ash for the trona industry in southwestern Wyoming, but the new contract is the company's first coal haulage contract. The coal from P&M's Kemmerer mine was previously transported to General Chemical by Union Pacific Railroad (UP).

Developments in the Powder River Basin Coal Field

The National Coal Association recently released a report that listed the top 10 coal-producing mines for 1988. Six of the top seven coal mines in the United States in 1988 were from Campbell County and the Powder River Basin, Wyoming. At the top of the list for the fifth consecutive year was Thunder Basin Coal Company's Black Thunder mine, which produced 24.9 million tons in 1988. Kerr-McGee Coal Corporation's Jacobs Ranch mine was third, followed by Cordero Mining Company's Cordero mine, Amax Coal Company's Belle Ayr and Eagle Butte mines, and Carter Mining Company's Caballo mine. Two other mines in the Montana portion of the Powder

River Basin, Western Energy Company's Rosebud mine and Decker Coal Company's Decker mine, ranked second and tenth, respectively. Lignite mines in Texas and North Dakota were also listed among the top ten coal mines.

The Black Thunder mine received additional distinction in October as it became the first coal mine in North America to produce and ship its 200 millionth ton of coal. After opening in 1977, the first 100 million tons were produced and shipped by July, 1985; the 200 millionth ton was shipped on October 24, 1989. Amax Coal Company's Belle Ayr mine reached the 200-million-ton milestone in December 1989. The Belle Ayr mine also was the first mine in the United States to reach both the 100 millionth and the 150 millionth ton milestones.

There was another milestone reached in 1989. Coal from the Powder River Basin of Wyoming was burned in Kentucky, formerly the leading coal-producing state in the United States and currently the leading eastern coal-producing state. In October, Kentucky Utilities Company (KUC), the State's largest electric utility, tested 10,000 tons of coal from the Cordero mine south of Gillette, Wyoming.

Evidently KUC wanted to see if Wyoming coal was a viable option to help it comply with anticipated acid rain legislation that will raise the clean air standards. It is expected that acid rain legislation will allow utility companies to meet increased stack emission standards by either burning lower sulfur coal or by installing scrubbers and other antipollution equipment. The Wyoming coal was the first western coal ever used by Kentucky Utilities Company. The test burn was reportedly a success and created no

operational or technical problems at KUC's Ghent power plant.

Coal contracts - Powder River Basin

A December solicitation by the Lower Colorado River Authority (LCRA) for spot coal to fuel Fayette Units 1, 2, and 3 resulted in F.O.B. mine bids that ranged from a low of \$3.80 a ton, submitted by Cordero Mining Company (a subsidiary of Sun Coal Company) to a high of \$5.10 a ton submitted by Peabody Development Company, owner of the Rochelle mine. A September solicitation by San Antonio City Public Service Company brought F.O.B. mine bids that ranged from \$3.54 a ton, submitted by Sun Coal Company, to \$5.00 a ton from both the Rochelle mine and the Black Thunder mine. In both these solicitations, the low bids in dollars per ton were also the lowest bids in cents per million Btu's.

Triton Coal Company's Buckskin mine recently lost some contracted coal tonnage when two utility companies decided to reduce their coal shipments. Western Farmers Electric Cooperative plans to reduce their burn of coal from 1.5 to 1.1 million tons in 1990 and make up the difference by burning natural gas, which is evidently comparable in price (at the busbar) to coal. Grand River Dam Authority (GRDA) ended deliveries of a maximum of 400,000 tons of coal from the Buckskin mine after accepting delivery of only 200,000 tons. GRDA apparently had too much coal stockpiled and in transit to need the additional coal.

In November, Kerr-McGee Coal Corporation was awarded a 5- to 7-year, 4.5-million-ton contract to supply Indiana-Michigan Power Company's Rockport 2 generating plant. This may be part of the

additional 2 million tons of coal per year that the utility was seeking earlier (see related story in Wyoming Quarterly Update, Fall, 1989, p.9). The coal will be mined at Kerr-McGee's Jacobs Ranch mine, transported by Burlington Northern Railroad (BN) to the Ohio River, and transferred to barge for delivery to Rockport No. 2. The 8,600-Btu per pound coal reportedly sold for a price between \$4.00 and \$4.50 a ton F.O.B. the mine.

Cordero Mining Company's Cordero mine will supply 120,000 tons of spot coal to LCRA's Fayette Units 1 and 2 near Austin, Texas. This is half of the 239,400 tons that LCRA originally solicited (see Wyoming Quarterly Update, Fall, 1989, p. 9, item no. 1); the \$3.50 a ton (F.O.B. the mine) price in the original solicitation was retained through a later solicitation that called for half the original tonnage.

Thunder Basin Coal Company (a subsidiary of Arco Coal Company) and Nebraska Public Power District (NPPD) recently completed amendments to a coal supply contract for the Gentleman, Nebraska generating station and signed a new agreement to supply coal to the Sheldon, Nebraska generating station. The price of coal from the Black Thunder mine to the Gentleman station was reduced from an earlier price. Because the new contract was retroactive to July 1, 1988, NPPD will receive a \$5 million refund on previously purchased coal. The contract will continue at 2.7 million tons per year through 1996. The new contract to supply NPPD's Sheldon plant calls for extending the current one-year, 500,000-ton per year agreement through 1996. These new coal supply agreements are expected to save NPPD's customers about \$57 million over the next 6 years.

Carter Mining Company's Caballo mine will supply 400,000 tons of spot coal to Iowa Public Service Company's George Neal No. 4 generating unit. Deliveries via Chicago and North Western Transportation Company began in September, 1989. Carter Mining also supplies this plant with about 2.0 million tons per year of contract coal.

Amax Coal Company has contracted with Omaha Public Power District to supply 1.1 million tons of coal from their Belle Ayr mine to the utility's North Omaha, Nebraska generating plant. Deliveries of the coal via Burlington Northern began in mid-November and will continue through the summer of 1990.

Rochelle Coal Company (through Peabody Development Company), Amax Coal Company, and Mobil Coal Producing, Incorporated have each signed coal supply contracts for 1990 with Pacific Power and Light Company. They will supply supplemental coal to the Dave Johnston power plant at Glenrock, Wyoming and possibly to the Jim Bridger power plant east of Rock Springs and to the Centralia, Washington power plant. Rochelle Coal Company will supply between 400,000 and 800,000 tons of coal from their Rochelle mine; Amax will supply between 200,000 and 400,000 tons of coal from their Belle Ayr mine; and Mobil will supply between 200,000 and 400,000 tons from their Caballo Rojo mine. The supplemental coal purchases are part of PP&L's continuing efforts to reduce power costs, to enhance boiler performance, and to extend the life of company-owned mines near the power plants (McGraw-Hill, 1989b).

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INDUSTRIAL MINERALS UPDATE

Aggregate (Construction)

The production of construction aggregate (sand and gravel, crushed rock, and railroad ballast), which probably increased in 1989, is also expected to increase in coming years. The railroad ballast quarry west of Cheyenne at Granite, Wyoming, is expanding, and increasing annual production. In 1987, Meridian Minerals, a division of Burlington Northern, Inc., purchased this quarry from Morrison-Knudsen. Meridian sells ballast to

both the Union Pacific and Burlington Northern Railroads. Burlington Northern, in agreement with Union Pacific, now has trackage rights to the quarry.

Although the production of construction aggregate declined during the last quarter of 1989 due to the weather, stockpiled fine aggregate is used on highways through the winter to increase traction on ice and snow. Production of aggregate should begin increasing again in the spring of 1990, particularly as highway construction projects resume.

Rissler & McMurry, a Casper-based construction company, has proposed construction of a new limestone aggregate quarry on the north side of Bessemer Mountain west of Casper. Local residents, however, are protesting the quarry's location.

Bentonite

Bentonite is a clay product that has many uses. It swells many times its dry volume when wet and has a high cation exchange capacity. Because of its sealing properties, it is the primary ingredient in oil and gas well drilling fluids, it is used to line settling ponds, and it is desirable for certain construction applications. It is also used in iron ore refining, foundry casting, soap, cosmetics, and as a mineral filler in many products.

In the value of its production, bentonite is Wyoming's second most important industrial mineral (after mined trona). The major producing areas are the Colony area in the northern Black Hills, the Clay Spur area in the southern Black Hills, the eastern Bighorn Basin, the Kaycee area,

and near Casper. Wyoming is still the Nation's largest producer of bentonite.

Since the main use of bentonite is for drilling muds, the decline in domestic oil and gas exploration has depressed the bentonite industry. However, because other uses of bentonite are increasing, bentonite production in Wyoming is increasing slowly.

Wyo-Ben, a bentonite mining company, has apparently been granted its application to expand its mining area near Greybull, in Big Horn County. To settle landowner protests, the company agreed to withdraw the ten percent of the acreage in the original permit that was adjacent to the landowners' properties.

Cement

In Laramie, cement production at Wyoming's only cement plant, reached full production in 1989 for the first time following the major renovation begun in 1987. The renovation, which modernized Mountain Cement's plant and enlarged its capacity, also changed the production system from a wet process to a dry process. This plant is providing Portland cement to construction projects in Colorado, Nebraska, and Wyoming.

Gypsum

Gypsum is produced in Wyoming at two localities in the Bighorn Basin where it is used for wallboard and at one locality near Laramie where it is used in the manufacture of cement (see previous section on Cement). The production of wallboard by Celotex Corp. in Cody, and by Georgia-Pacific, south of Lovell, remained relatively constant or increased slightly in 1989. The production of

gypsum by Mountain Cement near Laramie is keeping pace with the increased production of cement.

Mountain Cement opened a new gypsum quarry about eight miles south of Laramie. In the early 1900s, gypsum was mined in this area for use in a plaster plant located on the site. If this quarry produces suitable gypsum, it should result in considerable savings for Mountain Cement since the company was hauling gypsum 40 miles from the Red Mountain quarry southwest of Laramie.

Limestone

Limestone is quarried in Wyoming for construction aggregate (particularly highway base, sub-base, and surfacing), for cement, and for use in emissions control at coal-fired power plants. Wyoming has been exporting crushed limestone from near Hartville to the State of Nebraska for use as aggregate for road construction. In the past, limestone has been produced in Wyoming as dimension stone and as "sugar rock" for use in refining sugar beets.

Because limestone production in Wyoming is now heavily dependent on road construction, production decreased in November and December of 1989 with the seasonal slowdown in construction. Limestone production in 1990 should increase slightly over 1989 production. For the longer term, production of limestone is also expected to increase, especially if new markets are established in adjacent states.

Lime is a product made from limestone. Although lime (CaO) is made in Wyoming, it is not produced for commercial sale. In Laramie, Mountain Cement

manufactures lime for their cement plant. However, lime produced for cement is consumed in the final product. Lime is also produced in Wyoming through the process of refining sugar beets. In sugar beet processing, the lime is partly consumed and it is not sold as a product. Impure lime is stored as waste at sugar beet refining plants in Lovell, Worland, and Torrington.

Other lime used in Wyoming is purchased from commercial lime producers. The nearest commercial lime producers are Continental Lime Company at Townsend, Montana, the M.E.R.R. Co. near Tooele, Utah, and Calco, Inc., at Salida, Colorado.

There is a potential for commercial lime production in Wyoming because the State has many areas of easily-mined high-grade limestone resources, and it is located east of existing production in Montana and Utah. Apparently the major obstacles to the construction of a lime plant in Wyoming are transportation costs of the finished product.

Fertilizer

Fertilizer made from mined phosphate rock is produced in Wyoming at the Chevron Chemical Company plant near Rock Springs. Phosphate rock for this plant is mined near Vernal, Utah, and transported to the plant by slurry pipeline over the Uinta Mountains. In the plant, the phosphate is combined with sulfur derived from the processing of sour natural gas in western Wyoming. The resulting phosphate-based, acidic fertilizer is very suitable for agricultural regions located in relatively arid climates.

Fertilizer is also made in the Coastal Company's plant west of Cheyenne. Coastal Company, a division of Coastal States, was

called WYCON until late in 1989. Coastal's fertilizer is urea-based and ammonia-rich and does not use large amounts of mined resources in its manufacture.

Silica raw materials

Studies of two high-silica sand or rock deposits were recently completed by the Geological Survey of Wyoming (Harris, 1988a and 1988b), and a third deposit is now under investigation in the Lovell area. This latter study as well as the previous studies have been partially funded through the Wyoming Economic Development and Stabilization Board. The primary reason for these investigations is the current interest in possibly producing glass in Wyoming.

This current interest is due to several factors: transportation rates in general have become more favorable; there are new ways of manufacturing and transporting glass; and there has been promising research into heat resistant ceramics, which may be substituted for metal in products such as automobile engines. In addition, there is also the possibility that some of Wyoming's silica deposits might be suitable for industrial use as aggregate in concrete or as hydrofrac sand.

All of the major raw materials used to make glass, including silica, soda ash (refined trona), feldspar, limestone, and pigments, are found within Wyoming's borders. Several companies are currently investigating the development of a glass plant in Wyoming. It appears now that a glass and ceramic manufacturing industry may be a real possibility in Wyoming's future.

Sulfur

According to the U. S. Bureau of Mines, Wyoming is now second in the Nation

in terms of the production of sulfur from the processing of sour natural gas. Because sulfur demand is increasing at a rate of about six percent per year, there are markets for additional production of sulfur from Wyoming. Anticipated new demands for Wyoming's natural gas should provide this additional production.

Trona

With all the soda ash refineries in the State operating near their capacities, the production of soda ash (refined trona) and other sodium chemical products in Wyoming continued at record levels through 1989. Production in 1989 should easily surpass the record set in 1988, and 1990 production should exceed all previous production levels. Since over ninety percent of the soda ash produced in the U.S. comes from Wyoming, market increases have had a direct affect on the State's trona industry.

The dramatic increase in soda ash production is related to increased demand by the traditional users of the sodium compound in glass, paper products, chemicals, and other items, the use of soda ash in the production of caustic soda, and the increased use of soda ash in the production of sodium cyanide.

The increased demand for sodium cyanide is a result of a dramatic increase in the production of gold in the United States. Sodium cyanide is commonly used to leach gold from its ore. Nationally, annual gold production has increased from about 960,000 ounces to 6,500,000 ounces in the past ten years. While sodium cyanide is currently only produced by the DuPont companies, FMC has started construction of a sodium cyanide plant in Wyoming. FMC's plant will begin production in the fall of 1990. This plant is expected to produce about 60 million pounds of sodium cyanide per year.

The sodium cyanide plant is only one of three plants under construction by FMC in the trona mining area near Green River. FMC is also constructing a sodium bicarbonate plant. This plant will have to compete with the existing Church & Dwight facility, but projected demand is expected to support two plants. The third plant under construction is a caustic soda plant.

To increase their soda ash production to accommodate these three new plants, FMC is streamlining its mining and refining operation. In this regard, FMC has added a new longwall mining machine to its underground operation.

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URANIUM UPDATE

Uranium mining and future plans

Uranium is now produced at only two localities in Wyoming. Everest Minerals and Malapai Resources mine uranium by in situ, solution-mining methods and produce yellowcake at the Highland property and the Irigary-Christensen Ranch property, respectively. Both of these operations are in the Powder River Basin.

In addition, a large Canadian mining company, Rio Algom, has acquired property formerly held by Kerr-McGee in the Powder River Basin. Rio Algom, plans to construct

an in situ, solution mine and a mill near the former site of Kerr-McGee's Bill Smith project. If these plans prove out, and if Malapai and Everest Minerals continue to increase their production as planned, uranium production in Wyoming should show an increase again in 1990. Although these increases are very small compared to the boom years between 1973 and 1980, they are encouraging.

Wyoming's last producer of uranium by conventional open-pit mining methods closed its mill January 1, 1990. Pathfinder Mines is continuing to strip overburden from an ore body in the Shirley Basin in Carbon County. The Shirley Basin Mill is to remain closed at least for the winter. Pathfinder is owned by the French company COGEMA, and its production is tied primarily to CEGEMA's contracts with foreign utilities, especially some in the Far East. According to company officials, the mill will reopen when ore is mined again. The current low prices for yellowcake continue to take their toll of domestic operations.

The current price for yellowcake (\$9.60 per pound) is even lower than the figure would indicate. For example, uranium prices were \$6.00 to \$8.00 back in the early 1950s when prices were set by the Federal government. Adjusting for inflation, today's price for yellowcake is less than \$1.00 per pound relative to the prices in the 1950's. The current price may also be compared to an unadjusted price of \$42.00 per pound in 1979.

Today, although some domestic uranium might be producible for less than \$18.00 per pound, \$18.00 is the average cost to produce the uranium in the United States that is minable by conventional methods. In

situ, solution-mining methods, on the other hand, are apparently inexpensive enough that they can offer a viable alternative to conventional mining methods. This is why, even with the closure of most domestic uranium mines, certain in situ producers are expanding and constructing new facilities, like Rio Algom's planned operation in the Powder River Basin.

The U. S. nuclear power industry and fuel requirements

As of December 31, 1988, there were 108 operating nuclear power plants in the United States. These units generated a record 527 TeraWatt-hours (TWh), which were 19.5 percent of all the electricity generated in the U. S. (Energy Information Administration, 1989a). This represents a continuing increase both in the number of nuclear units and in their percent of the total power generated in the U. S.

The EIA's report shows the demand for yellowcake increasing in all but a "no growth scenario". After the present stockpile of yellowcake is depleted, requirements for yellowcake will have to come from newly-mined uranium. Whether these supplies come from the U. S. (including Wyoming) or from foreign sources is a matter of both politics and economics. It is a fact that uranium can be mined in Canada and Australia more cheaply than in the U. S. One of the major reasons for this is that uranium deposits discovered in those countries are much higher grade than those that have been discovered in the U. S. Consequently, so much more uranium is produced per unit of ore that the price of Canadian and Australian yellowcake is much less than the price for lower grade deposits. While this dichotomy in the quality of ore

deposits is a fact today, it should be remembered that much of the United States, including portions of Wyoming, have not been adequately explored. Given a viable domestic uranium industry, that exploration could resume and conceivably, new deposits, comparable in grade to the foreign ones, might be found.

In an effort to revive the domestic uranium industry, governors of several western states, including Wyoming's Governor Mike Sullivan, approved a resolution supporting Federal legislation that would help the western uranium mining industry. The resolution, offered by Governor Sullivan, supports a bill that would restructure the domestic uranium enrichment program, encourage the cleanup of abandoned mill tailings, and discourage the use of foreign uranium by the Nation's nuclear power industry. The resolution also noted that the United States imports more than half the uranium used by domestic nuclear plants, even though uranium is vital to national security.

Uranium reclamation projects

The cleanup of abandoned uranium mines and mill sites continues in certain areas in Wyoming. In 1990, reclamation is scheduled for an abandoned, 1950-vintage mine and small mill in northern Converse County. The mill site includes an unprotected waste pond that contains high concentrations of radioactive uranium daughter elements, toxic elements, and acidic compounds. The major concern with the remotely located mine and mill, called the Spook site, is its accessibility to livestock as well as wildlife. The contaminated material will be buried at the site in 49 to 65 feet deep pits lined with impermeable material. This project is expected to cost \$4.12 million,

which will come from the Federal Abandoned Mined Lands Reclamation Fund.

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METALS AND PRECIOUS STONES UPDATE

In an effort that ended up involving the cooperation of five government agencies, the Geological Survey of Wyoming received nearly 12 tons of drill core from the U. S. Bureau of Mines. The Minnesota Air National Guard transferred the core from the U. S. Bureau of Mines' Minneapolis research

facility to the Wyoming Air Guard at Warren Air Force base where the Wyoming Army National Guard picked it up and delivered it to the Geological Survey in Laramie. Thanks to all involved the odyssey came off without a hitch.

The core comes from the U. S. Bureau of Mines' 1940-vintage research projects on strategic minerals in Wyoming. Much of the core that we've been able to examine to date is from the Copper King mine in the Silver Crown district near Cheyenne, which is a copper-gold Proterozoic porphyry with large, low-grade reserves. According to the Bureau of Mines, there is also some core from the New Rambler copper-gold-platinum-palladium mine in the Medicine Bow Mountains, from a tungsten deposit in the Copper Mountain district, and from several other projects. Persons interested in viewing the core may do so by contacting W. Dan Hausel at (307) 766-2286.

Throughout 1989, company interest in Wyoming's metal and precious stone resources continued at a moderate pace. If inquiries to the Survey are any indication, the greatest interest is in gold, platinum, and palladium deposits. In addition to the inquiries on precious metals, however, the Survey received many inquiries about the State's copper, manganese, iron, diamond, and titanium resources. If prices for precious metals, copper, zinc, and titanium remain relatively high, Wyoming can expect to see more exploration dollars spent in 1990. And if these prices remain relatively stable and high over the next few years, there is a good chance that some gold or copper deposits might be developed in the State.

Additionally, the Metals and Precious Stones Division has begun preparation of a

report on the State's titanium resources. Wyoming has numerous titanium deposits in nearly every basin of the State, as well as in the Laramie Mountains of Albany and Laramie Counties.

South Pass

In 1990, the Geological Survey of Wyoming will publish a report on the mineral resources of the South Pass greenstone belt. The report will emphasize gold occurrences, and its publication should stimulate additional company and prospector interest in the region, particularly if gold prices remain above \$400 per ounce.

Briefly, investigations by the Geological Survey of Wyoming and others at South Pass indicate the presence of several small, but rich gold deposits as well as some large tonnage, low-grade gold deposits; a possible large tonnage, low-grade copper-silver deposit; a very large resource of iron; a potential for nickel deposits; and possibly some very large, but buried, gold deposits.

Mineral Hill district, Black Hills uplift

During the Fall, the Metals and Precious Stones Division responded to a request to examine some properties in the Mineral Hill district of northeastern, Wyoming. Mineral Hill is a Tertiary alkaline ring complex with a history of tin and gold mining. Samples of silicified trachyte, trachyte breccia, sulfide-bearing pyroxenite and quartz veins were collected from various prospects in the district.

At the Artic mine located on the southwestern edge of Mineral Hill, selected samples of silicified trachyte were collected. These samples did not contain any anomalous gold or rare earth mineralization. Although

no significant metals were detected, rock hounds will find some interesting rocks and minerals in this area. Samples of altered trachyte with drusy, purple, chalcedony fracture fillings were found, and amethyst crystals were discovered at the Artic #1 adit. This is one of only three documented localities for amethyst in Wyoming. The other two localities are the southern Absaroka Mountains near Yellowstone, and the Battle region of the Sierra Madre.

Other samples collected in the district were analyzed for a number of metals. The most interesting samples were those taken at the Treadwell open cut along the northwestern flank of Mineral Hill. Because samples of feldspathic breccia from the Treadwell yielded only background levels of gold, brecciation, at least at the Treadwell, was probably a post-mineralization event.

Using a backhoe, TRYCCO Minerals exposed two buried mine tunnels in the highwall of the open cut. Both tunnels were driven on parallel, horizontal veins and the accompanying silicified trachyte host rock. Samples of the vein contained quartz, minor pyrite, and abundant limonite stains and limonite boxworks. Samples taken from the horizontal veins contain anomalous gold and silver.

Cooney Hills, Laramie Range

The Cooney Hills are a group of low-lying hills located along the eastern margin of the Elmers Rock greenstone belt. Historically, the hills were explored for copper and gold during the Great Depression and probably again in the latter part of the 20th century. No major mines were developed, but there are scattered mines and prospects on cupriferous veins and shear zones. At one locality in section 20, T.23N., R.69W. (the

Whippoorwill mine), stratiform massive sulfides (pyrite) are exposed in a mica-quartz schist. This particular horizon is gossaniferous over a 4,000-foot strike length and a 20- to 40-foot width.

Samples collected in the Cooney Hills have only been partially analyzed. Unfortunately, the gold analyses are not yet available. Some other metals that were tested included gallium, tin, and tungsten. These were not anomalous and occurred in background-level concentrations.

Keystone district, Medicine Bow Mountains

When gold was discovered in the Keystone district in the 1860s, several rich veins were associated with the Keystone quartz diorite. Rich placers were also found in the adjacent Douglas Creek and its tributaries. The Keystone district includes several historical mines developed on N60°W-trending shears and veins subsidiary to the Nash Fork-Mullen Creek shear zone, which is a major suture zone dividing the Medicine Bow Mountains into two different tectonic terranes. The principal ore bodies were developed on veins in narrow shears, and on vein intersections. The shear structures are from 2 to 6 feet wide and splay to as much as 300 feet wide locally.

Some samples recently collected in the district have been partially analyzed. The most interesting samples were collected from the Keystone mine dump, but this is not surprising considering the numerous samples from this mine that have yielded anomalous gold assays (see Hausel, 1989a, p.124). Two of the samples showed anomalous gold with values of 2.1 ppm (0.06 oz/ton) and 22.0 ppm (0.64 oz/ton) gold. A brief examination of the mineralized zone revealed some tight folding associated with the shear structure.

McCann Pass, Hartville uplift

The Hartville uplift in eastern Wyoming includes a relatively well preserved eugeosynclinal section of Archean metasedimentary and metavolcanic rock. For nearly a century, iron ore was mined in the region from a group of hematite schists from several mines and prospects including the Sunrise, Chicago, Central, Michigan, and Good Fortune mines.

The McCann Pass fault northeast of the Sunrise mine has some impressive massive sulfides (pyrite) and associated gossans, which were locally mined near the turn of the century. In places, the gossans are so prominent that the area has been called "gossan hill". Samples collected from the historic Charter Oak mine along this structure yielded anomalous copper mineralization.

Red Desert Basin

The Red Desert Basin has produced some enigmatic gold anomalies. For example, Albert (1986) reported stream-sediment samples yielded values as high as 6.55 ppm gold. The author recently collected two stream-sediment samples in the basin south of Crooks Gap and had them tested for gold (sections 2 & 10, T.26N., R.93W.). These samples, which were collected from poorly developed dry drainages within one foot of the surface, were concentrated on a Wilfley table. One of the two samples assayed 2.4 ppm gold!

These gold occurrences are intriguing in that they appear to be relatively widespread across the State (see Albert, 1986; Hausel, 1989a). The gold occurrences, whether they are of detrital or geochemical origin, may end up representing a whole new

class of gold deposits previously overlooked by exploration geologists.

Seminole district, Seminole Mountains

Little is really known about the mineral deposits in the Seminole Mountains of central Wyoming. Copper and jade occur in the district; the iron resources are enormous; and potential for commercial gold mineralization appears to be high based on the relatively common occurrence of visible gold in vein samples.

Field investigations of this region by the Geological Survey of Wyoming began in the late summer of 1989. The Survey is mapping the district on a 1:24,000 scale and is sampling veins, shear zones, and gossans at the base of komatiite successions for gold, nickel, and chromium. Samples taken to date indicate this greenstone belt is worthy of serious examination. Using previous mapping and recent reconnaissance mapping by the Survey, a preliminary map of the district was completed this Fall (Hausel, 1989b). The map shows a complex network of veins on Bradley Peak, and thick basaltic komatiite and serpentinite units in the district.

Samples collected from the veins, show that these quartz-carbonate-sulfide structures are highly mineralized. In 1981, the author collected several samples in this area that assayed as high as 98.4 ppm (2.87 oz/ton) gold. Some of these samples exhibited visible gold. More recently, vein samples collected in the district also showed anomalous gold. The vein samples ranged from 0.87 ppm (0.025 oz/ton) to 28 ppm (0.82 oz/ton) gold.

Serpentinites and spinifex textured basaltic komatiites all have relatively high chromium and nickel contents. Of the few samples assayed to date, nickel contents were from 73 ppm (0.007% to 1,700 ppm (0.17%), and chromium contents were from 370 ppm (0.04%) to 7,330 ppm (0.73%).

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Table 1. WYOMING MINERAL PRODUCTION FORECAST TO 1993¹.

Calendar Year	Oil Production ²	Methane Production ³	Carbon Dioxide Production ³	Helium Production ⁴	Coal Production ⁵	Trona Production ⁵	Mined Uranium Production ⁶	In situ Uranium Production ⁷	Sulfur Production ⁸
*1981	122.1	455.4	—	—	102.8	11.8	4.6	—	0.05
*1982	118.7	465.1	—	—	107.9	10.1	2.1	—	0.07
*1983	120.9	539.7	—	—	112.2	10.5	3.0	—	0.57
*1984	127.8	600.1	—	—	130.7	11.0	1.6	—	0.63
*1985	131.0	597.9	—	—	140.4	10.8	0.6	—	0.80
*1986	122.4	563.2	23.8	0.15	136.3	13.3	0.3	—	0.66
*1987	115.9	622.7	110.5	0.84	146.5	13.6	0.2 ⁹	0.06	1.20
*1988	114.3	701.1	110.5	0.84	163.6	14.9	0.3	1.4	1.20
1989	108.0	704.5	110.5	0.84	170.0	15.0	0.2	2.0	1.20
1990	103.6	729.0	110.5	0.84	177.1	18.0	0.2	2.0	1.20
1991	98.1	754.1	110.5	0.84	183.8	18.0	0.1	3.0	1.20
1992	92.9	780.1	110.5	0.84	189.2	18.0	0.1	3.5	1.20
1993	88.0	806.8	110.5	0.84	193.1	21.0	0.1	4.0	1.20

*Actual values for comparison; ¹Geological Survey of Wyoming, October 1989; ²millions of barrels; ³billions of cubic feet; ⁴billions of cubic feet, based on Exxon's estimate that the average helium content in the gas processed at Shute Creek is 0.5 percent; ⁵millions of tons; ⁶millions of tons of uranium ore (not yellowcake); ⁷millions of pounds of yellowcake (U₃O₈), (unknown between 1981-1986 because it was reported only as taxable valuation; estimates for 1989-1993 are based on company information); ⁸millions of tons, converted from gallons of sulfur produced at gas processing plants as reported to the Wyoming Oil and Gas Conservation Commission; ⁹includes previously stockpiled ore processed by the Lucky Mc mill in 1987.

Wyoming Agricultural Outlook

The agricultural outlook for 1990 points towards stable incomes across nearly all commodities. Farmers net cash income likely will exceed \$50 billion for the fourth consecutive year, and up 2-4 percent from 1989. However, if we exclude government payments, net farm income may decline as commodity prices continue easing from the spikes caused by the 1988 drought. The lower prices will likely dampen the value of the fall 1990 crops.

The world agricultural outlook calls for rebounding commodity output, rising consumption, and falling stocks of most crops. In 1990, world animal product output will go up slightly, led by much larger U.S. poultry production. Assuming normal weather patterns, U.S. and foreign production of many crops could rise again and some stock rebuilding may take place.

USDA is forecasting U.S. agricultural exports to decline somewhat from a year earlier, to \$38 billion. Total volume is edging lower, and prices are expected to weaken moderately.

GRAINS SITUATION

In 1989, U.S. producers set aside 59 million acres. Some 29 million, nearly half the total, were under annual government programs. The lowering of acreage reduction requirements for participation in the annual wheat and cotton programs will bring some of this land back into production.

Crop yields remained slightly below trend in 1989/90, reflecting drought damage to the winter wheat crop and subnormal

conditions for several other crops. Subsoil moisture in the Corn Belt is much improved over a year ago. Also, new technology and better production practices should continue to add to productivity. For the combined crops of wheat, feed grains, and soybeans, the projected trend yield for 1990 is nearly 2 1/2 percent above the yield realized in 1989.

U.S. and world wheat stocks are the lowest in years--the large cushion of 2 to 3 years ago has been cut dramatically. Reacting to market signals, world wheat production in 1990 may be headed for a second consecutive record. World import demand is expected to continue to expand, if only modestly. Global wheat stocks are likely to increase. But, any unexpected drop in production or a shift in import policy, particularly for the USSR or Eastern Europe, could cause total world wheat trade to jump sharply, shrinking stocks again. With very low existing global stocks, any significant upturn in import demand could push wheat prices sharply above current expectations. Prices received by farmers are forecast to be \$3.80-\$3.95 per bushel, the highest in nominal terms since the record \$4.09 in 1973/74.

The current marketing year promises good returns to wheat producers. The U.S. has announced program provisions requiring that very little wheat area be held out of production in 1990. These factors almost guarantee a larger U.S. wheat area.

A couple of factors point to an increase in the 1990 corn harvest. Enrollment in the feed grain program this spring is expected to be down slightly. Also, fewer farmers are likely to sign up for the 0-92 provision, some

are expected to switch soybean acres planted under the 10-25 option back to corn, and some are expected to plant more permitted acres. These moves would boost plantings to around 75 million acres, up from 72.3 million in 1989.

Yields are also expected to improve in 1990. For the four droughts preceding 1988--those in 1970, 1974, 1980, and 1983--yield was higher the second year following the drought than the first year following it.

The season-average farm price for corn is forecast to range between \$2.10 and \$2.40 a bushel, compared with last year's \$2.54. To some extent, 1990 will again be a weather market for feed grains.

LIVESTOCK SITUATION

Fed cattle marketings during the first quarter of 1990 are expected to average about 1 percent above a year earlier. This increase may be partially offset by fewer cows in the slaughter mix, however total slaughter is still expected to be slightly above last year. Continued heavier average slaughter weights may push January-March beef production about 2 percent over a year ago.

Fed cattle prices, supported by lower slaughter rates, continued to trade near the \$80 mark in early February. However, after the 7 states cattle on feed report was released February 16, a number of factors, including a sharp drop in the Japanese stock market, caused sharp drops in both the cash and futures markets. It is anticipated that this sharp decline will be temporary, and that the cash market will return to the high \$70's before declining to the lower \$70 range by early summer.

Fed cattle marketing rates usually bottom in early spring before trending seasonally higher into late summer. Although the same general pattern may hold again this year, daily average marketings are expected to bottom earlier than usual and may also peak in early summer. As a result, fed cattle prices may retreat to the upper \$60's or low \$70's by midsummer.

After dropping steadily since 1982, cattlemen began to rebuild inventories during 1989. Returns to cow/calf operations were dramatically higher during recent years in comparison with the first half of the 1980's. Still, inventory growth will remain modest as cattlemen continue to recover from the financial debacle of the early 1980's and recurring drought during the past two years.

Herd expansion is still being held in check by the slow recovery from financial reversals in the early 1980's as interest rates skyrocketed to peaks over 20 percent and asset values plummeted. In addition, dry pastures, ranges, and stock ponds over significant portions of cow country during 1988 and 1989 kept cattlemen from expanding rapidly despite improving financial incentives. Tax code changes that alter capital gains treatment and pre-production expensing of retained heifers (later changed) also helped delay and prolong expansion plans.

Returns to most cow herd operators rebounded in 1989 from drought-reduced levels a year earlier. Estimated returns have been favorable since 1986 with prospects for another good year in 1990. As a result, incentives to expand continue to accrue. Ten years ago, a shorter period of profitability led to an unsustainable 4 percent expansion of the cow herd that later contributed to the

industry's financial woes as the accumulated inventory was liquidated. More moderate growth rates in the 1-2 percent per year range appear more consistent with current demand for beef.

Purchase prices for five-weight feeder steers going to grass this spring should approximate last year's levels and selling prices off grass this fall may marginally lower. As usual, prospects for summer grazing programs will hinge on grass conditions, the magnitude of price declines this summer and fall, and the rate of gain. Substantial areas of the Great Plains and West continue to be plagued by dry soil conditions and below normal precipitation rates. In Wyoming, grass

conditions in many areas are more uncertain than usual. Abundant and timely spring rains can still alleviate much of this concern.

The upshot of the current outlook for feeder cattle, is to expect continued high prices for five-weight grass cattle through the spring, with prices off grass in September to be \$1-3 below what producers received in 1989. A \$20 negative buy/sell relationship will squeeze profits unless we have abundant rains and resulting cheap grass.

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Table 2

JANUARY 1 CATTLE INVENTORY 50 STATES



Wyoming Coincident Indicators Index

There have been several changes to the Wyoming Coincident Indicators Index (WCII) for 1989. The U.S. Index of Four Roughly Coincident Indicators has been revised and the base year changed from 1967 to 1982 (U.S. Index = 100 for the year 1982). To be consistent with the U.S. Index the WCII has also been changed to a base year of 1982 (WCII = 100 for the year 1982). Additionally some of the data were revised for the WCII. The annual revisions to the "Employment" series used in the WCII have been included, and the "Total Sales and Use Tax" series has been revised to eliminate the statistical disturbances created by county optional rates. The graph of the Non-seasonally Adjusted WCII has been eliminated since it does not contribute to the analysis. For these reasons the WCII may look quite different, but the changes allow for a more direct comparison of the Wyoming economy to the U.S. economy. For this analysis all data series have been seasonally adjusted, and data for the variables of total covered wages, and sales and use tax collections have been deflated using the U.W. consumer price index.

The WCII is derived using several economic variables which tend to change concurrently with the overall Wyoming economy. The index is computed quarterly by the Division of Research and Statistics, Department of Administration and Fiscal Control. The WCII is composed of four variables which are; 1) total State employment, 2) total wages reported for the quarter, 3) total sales and use tax collections, and 4) an industrial index. The industrial index is a composite of variables which

represent three important Wyoming industrial sectors. For the industrial index, mining is represented by the number of active oil well drilling rigs; the agricultural sector is represented by an index of prices received for all Wyoming agricultural commodities; and tourism is represented by the total volume (in gallons) of motor fuels plus gasohol sold.

THIRD QUARTER 1989 WCII

Annual Comparison:

The third quarter 1989 seasonally adjusted WCII weakened further and dipped below the stable range maintained for twelve quarters from mid 1986 through mid 1989. This is the third consecutive quarter in which the WCII has shown year to year weakness. An annual comparison of seasonally adjusted WCII values (third quarter 1989 to third quarter 1988) shows a decline of 1.5 percent. Three of the four index variables were down from the previous year. Annual decreases of 4.3 percent for total employment, 3.1 percent for total covered wages, and 2.9 percent for sales and use tax collections, offset a 4.1 percent increase for the industrial index and led to the overall decline. Annual results for components of the industrial index were as follows: The agricultural commodities price index increased by 4.7 percent, gallons of motor fuels plus gasohol sold increased by 3.8 percent; and the oil drilling rig count matched that of the previous year. The solid increase in the industrial index was the bright spot for the third quarter WCII.

Quarterly Comparison:

On a quarterly basis, the third quarter 1989 seasonally adjusted WCII was down 0.8 percent from the second quarter of 1989. Increases of 9.9 percent in the industrial index and 4.9 percent in sales and use tax collections were not enough to offset decreases of 3.9 percent in total employment and 3.6 percent in total covered wages. Within the industrial index the oil well drilling rig count led the way with a whopping 67.5 percent increase from the previous quarter. The agricultural commodities price index increased much more modestly by 1.1 percent, and gallons of motor fuels plus gasohol sold followed the trend with a 0.7 percent increase.

SUMMARY

Overall the WCII shows definite weakness for the first three quarters of 1989 when compared to 1988. Consecutive annual declines of 1.3 percent, 2.0 percent and 1.5 percent show that the economy is weaker than the year before. In the third quarter the WCII also dipped below the stable range which had prevailed for three years. On the positive side the drilling rig count rebounded in the third quarter and the industrial index component showed some broad-based strength. The index warrants continued close watching in the near future to see if conditions continue to weaken or if they begin to improve.

Early signals for the fourth quarter are more positive than negative suggesting some improvement over the first three quarters of 1989. Sales and use tax collections are up an average 3.3 percent annually based on data

for October and November. The industrial index should also show improvement with a nominal annual increase of 0.4 percent in the agriculture commodities price index, and a very strong 65.2 percent increase in active oil well drilling rigs. Both of these changes are based on data for the months of October, November and December, though some of the data is preliminary and will be revised. Employment continues to be negative with a 2.6 percent drop from the previous year for the month of October. On a quarter-to-quarter basis sales and use tax collections are up a solid 5.8 percent for October and November, and employment is up 2.6 percent for October. The rig count is up 4.4 percent from the third quarter showing continued improvement. The agricultural commodities price index is showing a quarter-to-quarter decline of 3.2 percent but may be subject to revision.

It is important to keep in mind that the data series used in the WCII have been seasonally adjusted and also that the "total covered wages" and the "sales and use tax collections" series have been deflated using the U.S. Consumer Price Index. These data adjustments affect the raw data. The purpose of seasonal adjustment is to average out seasonal fluctuations which occur in predictable patterns on a regular basis year after year. Once the data is seasonally adjusted any change in a data series between time periods gives a more accurate indication of actual changes in economic conditions. Similarly, by deflating data series which are in monetary units of measurement, a more accurate indication of "real" change is produced. As an example, even though actual sales and use tax collections for the first six months of 1989 are about the same as for the first six months of 1988, the purchasing power has declined from the previous year due to

inflation. In effect "real" (in the sense of purchasing power) sales and use tax collections have indeed declined.

DATA SOURCES

Total State Employment (monthly): Wyoming Employment Security Commission, Research and Analysis Section.

Total Reported Wages (quarterly): Wyoming Employment Security Commission, Research and Analysis Section.

Total 3% Sales and Use Tax Collections (monthly): Wyoming Department of Revenue and Taxation, Collections Division.

Active Oil Well Drilling Rigs (weekly): Oil and Gas Journal, PennWell Publishing Company. Tulsa, Oklahoma.

Total Gallons of Motor Fuels and Gasohol Sold (monthly): Wyoming Department of Revenue and Taxation, Collections Division.

Wyoming Agricultural Commodities Price Index (monthly): Wyoming Agricultural Statistics Service, Crop and Livestock Reporting Service.

Consumer Price Index - All Urban Consumers (monthly): U.S. Department of Labor, Bureau of Labor Statistics.

U.S. Index of Four Roughly Coincident Indicators (monthly): Business Conditions Digest, U.S. Department of Commerce, Bureau of Economic Analysis.

Steve Furtney
Economist
Research & Statistics Division
Department of Administration
and Fiscal Control

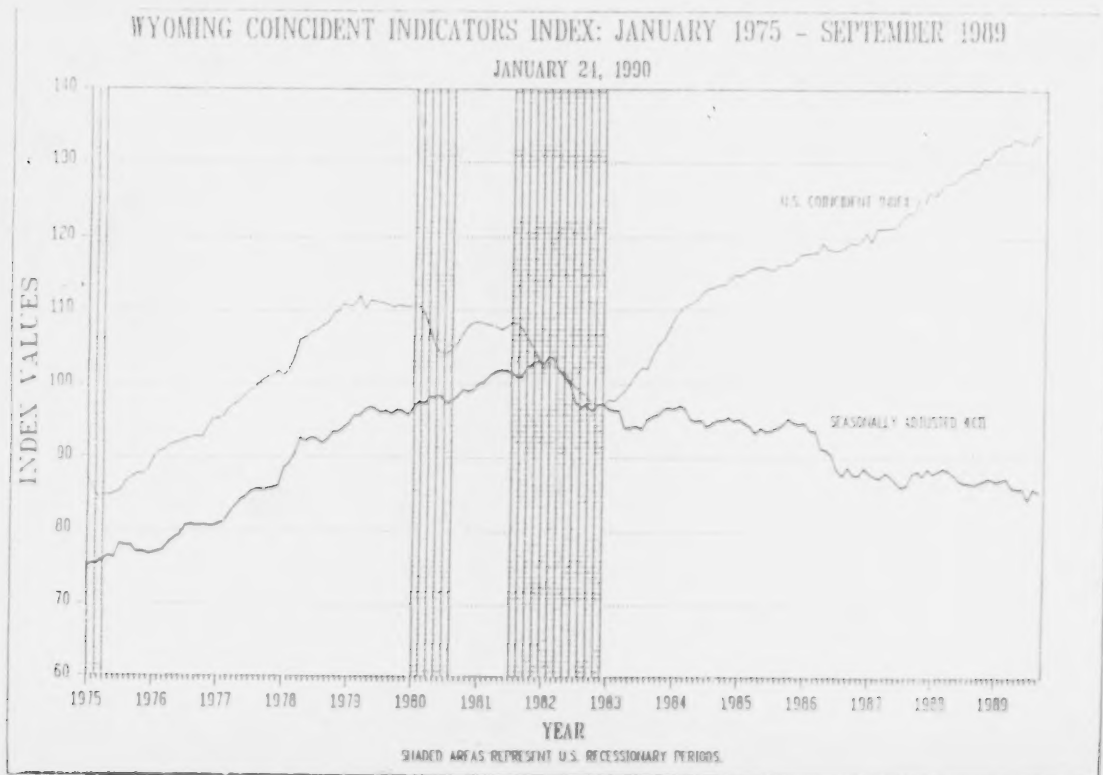


Table 3

Job Openings Outlook

MILITARY ATTACHES

Attaches in the military collect and report information about the military forces of foreign countries and hold meetings with foreign military and government officials. They also analyze political, social, and economic matters in foreign countries, project foreign political trends, and advise commanders about situations in foreign countries. All military attaches are officers.

Attaches work mainly in offices of U.S. embassies and missions located in foreign lands. Services offering this occupation: Army, Navy, Air Force, and Marine Corps.

To serve in the military, a person must be at least 17 years old; the maximum age for enlistment varies. To enlist, a person must pass a physical exam and an aptitude test. An enlistee must also meet military standards of discipline and be a U.S. citizen or permanent resident alien. A four-year college degree in political science, history, international affairs, or a related field is normally required to enter this occupation. Some specialties require an advanced degree. Knowledge of the people and language of one or more foreign countries may be required.

Wages depend mostly on rank or grade and length of service. Bonuses and the situation in which the individual is serving (flight duty, sea duty, hazardous duty, etc.) also affect pay.

Job training is available in some specialties. Training length varies by entry

requirements and specialty area. Course content includes political and cultural awareness, and the development of foreign area expertise. It also covers the organization and functions of diplomatic missions. Further training occurs on the job.

The services have about 460 attaches. On the average, they need about 25 new attaches each year, but the number of applicants for these positions is not known. Normally, attaches are selected from among officers who have at least several years of military experience. Officers selected to be attaches are from various military career fields. Usually, they return to their main career field after several years duty as an attache.

MILITARY ELECTRICAL AND ELECTRONICS ENGINEERS

Electrical and electronic engineers in the military direct the installation and repair of electrical and electronic equipment and systems, and develop test standards and operating instructions for those systems. Other duties include testing new or modified electrical and electronic equipment to check its performance and reliability. They also review test data, report results, and recommend actions. These engineers direct programs to develop computer, navigation, and other electronic systems. All military electrical and electronics engineers are officers.

Electrical and electronics engineers usually work indoors while planning research studies and designing electronic systems. Sometimes they work outdoors when overseeing the installation of new equipment. Services offering this occupation: Army, Navy, Air Force, Marine Corps, and Coast Guard.

To serve in the military, a person must be at least 17 years old; the maximum age for enlistment varies. To enlist, a person must pass a physical exam and an aptitude test. An enlistee must also meet military standards of discipline and be a U.S. citizen or permanent resident alien. A four-year college degree in electrical, electronic, or communication engineering is required to enter this occupation.

Wages depend mostly on rank or grade and length of service. Bonuses and the situation in which the individual is serving (flight duty, sea duty, hazardous duty, etc.) also affect pay.

Initial training is usually provided on-the-job. Classroom training is provided for some specialties in this occupation. Course content includes combat and tactical communication systems, telecommunication center systems, and signal center site defense systems.

The services have about 5,440 electrical and electronics engineers. On the average, they need about 540 new engineers each year, but the number of applicants for these positions is not known. After job training, officers are usually assigned to an engineering research and development unit or to a communications center. Initially, they conduct studies and supervise research and development staff. With experience, they may advance to senior management positions such as engineering staff officer, research and development manager, or communications center director.

Suzanne McGuire
Research Assistant, WCIS

The U.S. Census Is Coming!

In the United States a census has been taken every 10 years since 1790. Census Day, April 1, 1990, will mark 200 years of census taking. While the purpose of the Census, as set forth in the Constitution, is to provide reliable information on which to base how many seats each state will have in the House of Representatives; the Census also serves many other functions. For example, about \$38 billion in federal funds are allocated to states annually based on census data. Census data is also used to allocate some state funds to local government and aids business and industry in determining site selections for retail stores and new plants.

The 1990 Census has been in planning since 1984 and is expected to count 250 million people (23 million more than were counted in the April 1980 Census) and 106 million housing units, and will hire about 565,000 people. Several changes have been made in the 1990 Census form. The 1990 form now distinguishes between a householder's stepchildren and natural-born or adopted children. Whether or not a home is air-conditioned has been dropped and a question on heating with solar energy has been added. In 1990 improved data on the economic status of the elderly will hopefully

be obtained by inquiring about pension income. Another added feature will be questions on how long it takes individuals to get to work and when they leave, as well as if they commute by ferryboat.

Obviously a project of this size is bound to make mistakes. In the last census about 1% (2.2 million) were not counted. This is termed the undercount and for minorities the number rose to almost 6%.

There are two District Offices in Wyoming. Their addresses are:

Bureau of the Census
Cottonwood Park
907 N. Poplar Suite 101
Casper, WY 82601
472-5700

Bureau of the Census
2020 Capitol Ave.
Cheyenne, WY 82001
635-1300

The Survey Research Center will attempt to keep our readers informed on the results of the 1990 Census with a regular feature in all of this year's Updates.

CENSUS '90



Answer the Census.
It Counts for More Than You Think.

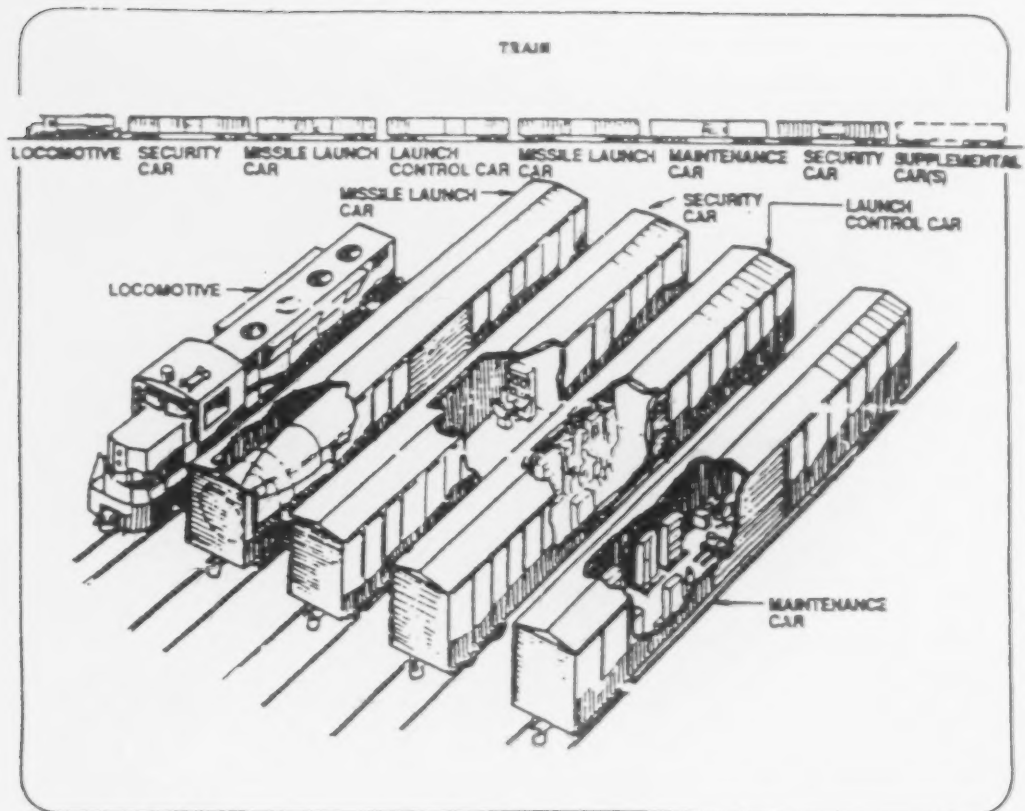
FYI

CURRENT POPULATION ESTIMATES FOR WYOMING COUNTIES, 1990

Laramie	72,542
Natrona	66,627
Sweetwater	42,608
Fremont	37,235
Albany	30,652
Campbell	29,233
Sheridan	24,979
Park	23,575
Uinta	20,750
Carbon	17,885
Lincoln	14,405
Goshen	13,596
Converse	12,019
Teton	11,467
Big Horn	11,289
Washakie	10,194
Platte	9,829
Weston	7,275
Johnson	6,646
Hot Springs	5,925
Crook	5,773
Sublette ¹	5,112
Niobrara	3,222

Source: WSDC bulletin, Wyoming State Data Center, Department of Administration and Fiscal Control, Division of Research and Statistics, February, 1990.

Feature Articles



A Brief History of F.E. Warren Air Force Base

Francis E. Warren Air Force Base is one of six strategic missile wings in the United States. The base has the distinction of having evolved from a noteworthy frontier infantry and cavalry post into the largest, most modern strategic missile facility in the United States. The history of the base dates back to 1862, when President Abraham Lincoln set forth plans for a military installation in the Wyoming Territory to protect Union Pacific Railroad workers from hostile Indians.

Five years after the plans were set, the railroad established its mountain region headquarters at Cheyenne. In 1867, the U.S. Cavalry moved three miles west from temporary headquarters in Cheyenne west and established Fort David A. Russell, named after a Civil War hero killed in action at Chantilly, Va. Thus, 1867 was the beginning of a city and a fort, and both grew together over the years. The fort ultimately became the largest cavalry post in the United States. Many former stables still at the base today are testimony to large numbers of horses and mules.

The new fort was built adjacent to Crow Creek, strategically located halfway between the Canadian and Mexican borders and only a few hundred miles closer to Los Angeles than to New York. Detachments of the 30th Infantry and 2nd Cavalry formed the first garrison under the command of Brevet Brig. Gen. John D. Stevenson. For a brief time the troops lived in log huts and tents, but during the winter of 1867-68, they moved into wood frame quarters. The dwellings were set in the shape of a diamond, which

opened to the east and had axis measuring 800 and 1,040 feet. The entrance to the original fort was next to the present Chapel 1.

The first troops stationed here lived the rough frontier life, which meant coping with the rigors of the weather in winter and Indians in spring and summer.

In 1876, troops from Fort Russell participated in the Sioux Wars, which decimated General Custer's forces.

Fort Russell became a permanent post in 1884 because of its strategic location. In 1885, the War Department ordered the post rebuilt to serve eight infantry companies. The Army built 27 red brick buildings to replace the older wood frame structures, including barracks and NCO and officers' quarters. The Army built a large brick hospital in 1887 and an administrative building in 1894. Construction continued into the 1920s, helping establish a military construction pattern at posts throughout the nation.

In 1890, the first black troops served at Fort Russell. They established an exceptional combat record.

In 1898, the Spanish-American War brought renewed importance to the post. Soon after President McKinley sent a message to Congress, the 8th Infantry left for Cuba. Later, the Wyoming National Guard mustered into service at the post and departed for duty in the Philippines. The bells they captured are on display near the flagpole.

In 1906, Secretary of War William H. Taft recommended that Fort D.A. Russell become a brigade-size post. By 1910, a large number of red brick quarters, offices and stables were complete.

From 1913 to 1916, units stationed at the post patrolled the U.S.-Mexico border. During World War I, the post served as a mobilization point and training facility for field artillery and cavalry groups. As World War I began, Fort Russell was the largest exclusively-military post in the United States.

Between 1919-1920, the post had a brief flying history. The Western Flying Circus, led by then Maj. Carl "Tooey" Spaatz (later promoted to general and Air Force chief of staff), first used the post airfield in 1919. The Army abandoned the airfield, in today's Wherry Housing area, after Cheyenne built an airmail field in 1920, now Cheyenne Municipal Airport.

During the 1920s the post almost entirely housed cavalry and artillery units, along with hundreds of the Army's finest horses and mules. During this period, the Army built two polo practice fields, a polo exhibition field and a 28,000 square-foot indoor riding arena. Teams still play polo here, perhaps an Air Force exclusive.

In 1930, President Herbert Hoover changed the name of the post to Fort Francis E. Warren, honoring the Wyoming Territorial governor, first state governor and U.S. senator for 37 years. Senator Warren received the Medal of Honor when he was 19, for heroism during the Civil War.

Senator Warren's daughter married Capt. John J. "Black Jack" Pershing, who later commanded the U.S. forces in World War I and became general of the armies. Only one other man, George Washington, served our nation in that capacity. General Pershing's

family quartered at the fort for a time in a home still in use today and marked with a plaque. Other distinguished residents over the years, both captains at the time, were Brig. Gen. Billy Mitchell and Gen. Mark Clark, and Dr. Walter Reed.

During World War II, Fort Warren again enlarged with hundreds of temporary buildings for training U.S. Army Quartermaster Corps people. Warren also housed a prisoner-of-war camp.

In 1947, 80 years after the fort's founding, the 5th Army relinquished it to the Air Force and it became Francis E. Warren Air Force Base. As an Air Force installation, the base initially was a training facility.

In 1958, the base ceded to Strategic Air Command, and organized as the nation's first solely intercontinental ballistic missile wing. Warren had the central command and control for Atlas D and E missile wing missile sites constructed in eastern Wyoming, western Nebraska and northern Colorado.

Soon the unit became the 90th Strategic Missile Wing. On July 1, 1963, the wing became the free world's largest ICBM unit with 200 Minuteman I missiles in the tri-state, 12,600 square-mile area.

In 1975 the wing converted the Minuteman I missile sites to Minuteman IIIs and, in December 1988, completed deployment of 50 Peacekeeper missiles to replace 50 of the wings's 200 Minuteman IIIs. These strategic missile changes keep Warren at the forefront of our nation's defense, as the free world's largest, most modern ICBM base.

90th Strategic Missile Wing
Public Affairs Office

Economic Effects of F.E. Warren AFB On Its Host Community

On December 19, 1986 the White House announced plans to begin the development of a Rail Garrison system for the Peacekeeper Intercontinental Ballistic Missile (ICBM). Currently seven bases have been selected to house this rail-mobile version of the MX nuclear missile including Grand Forks AFB in North Dakota, Little Rock AFB in Arkansas, Barksdale AFB in Louisiana, Fairchild AFB in Washington, Dyess AFB in Texas, and Wurtsmith AFB in Michigan. F.E. Warren Air Force Base in Cheyenne has been selected as the headquarters for the Rail Garrison system and will serve as the main training, assembly, and

maintenance facility. How the Air Base in general, the introduction of the Rail Garrison system, and the reorganization necessary for its implementation will affect Cheyenne will be explored.

At the present time Warren houses 50 MX Peacekeeper missiles, at least 40 of which will be removed once the Rail Garrison system becomes operational. These missiles are contained in 50 converted Minuteman silos all within Wyoming (see figure 1). There are 10 silos per flight and the MX flights are Q, P, R, S, and T.

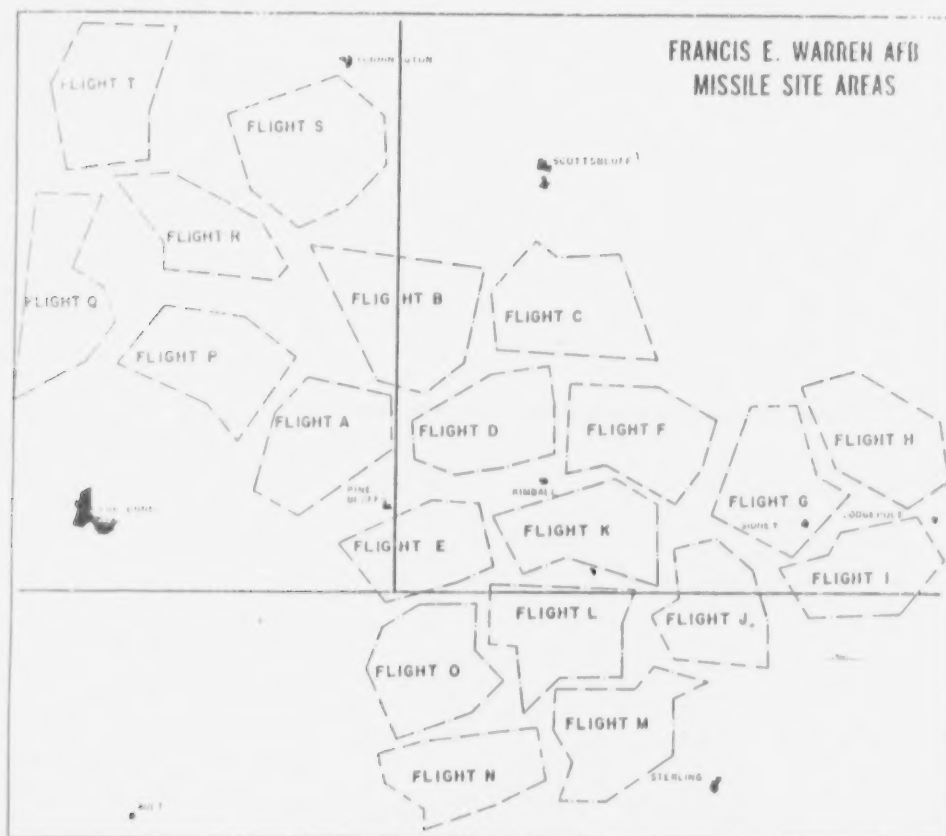
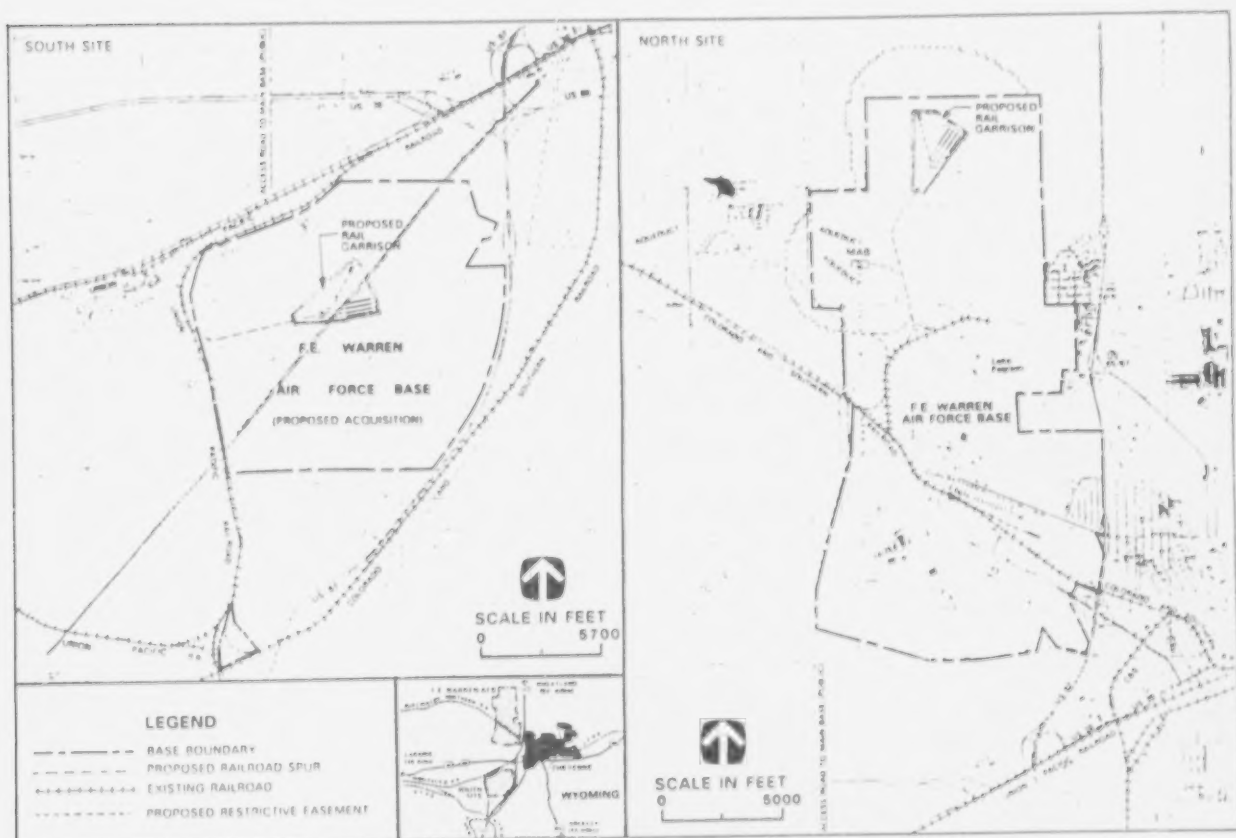


figure 1

In contrast, the Rail Garrison system will involve only an estimated 8 MX missiles all housed at the garrisons in figure 2. According to officials at F.E. Warren AFB the 50 silos currently in use will remain vacant in a caretaker status. The garrison concept will involve fewer missiles which would remain within secure areas of the base. The missiles would be removed only during

periods of high international tension. Because the implementation of the rail garrison involves a certain restructuring of operations at the Air Base it is advantageous to first examine the effects of the Base in general on the community and how the ICBM affected the community when it was first introduced.



PROPOSED PEACEKEEPER RAIL GARRISON FACILITIES AT F.E. WARREN AFB, WYOMING

figure 2

The Cost Branch, Comptroller Squadron at F.E. Warren publishes an Economic Resource Impact Statement on a yearly basis in which is declared the amount of money generated by the base on the

Economic Impact Region (EIR). The EIR encompasses the area within a 50 Mile commuting radius from the center of F.E. Warren AFB. (See Figure 3)

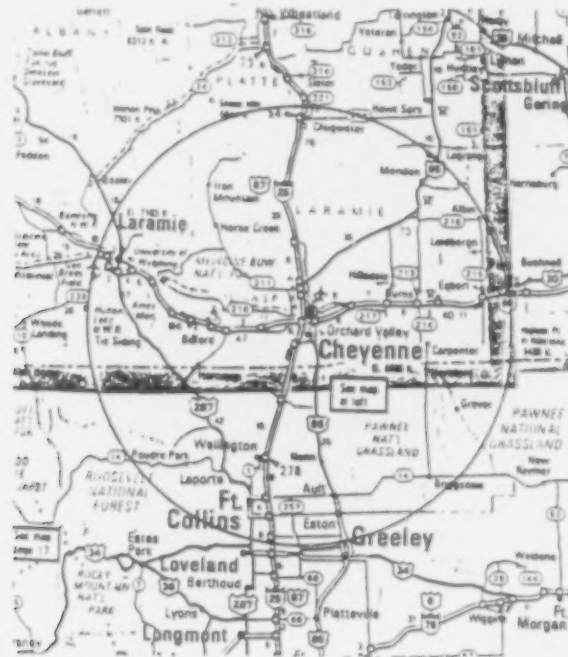


figure 3

For 1989 this figure totaled \$217,385,568 and included monies for payroll, contracts, supplies, and educational impact aid. This is money that actually goes into the EIR. This figures is arrived at through a variety of mathematical formulas too extensive for the scope of this paper but does not include all the money generated by the Base. In fact the following was reported in a 1987 Laramie County Economic Base Study done by the Center for Economic and Business Data at Laramie County Community College:

"However, research showed that approximately 47.5 percent of all 1987 payroll funds generated at F.E.

Warren were spent in the local economy. In 1986 the percentage was 32.5 percent. The reasons why so little total payrolls make it into the local economy are varied, but some of the major causes are: 40.3 percent of the military personnel assigned to F.E. Warren live on base and thus the local housing market is denied this potential demand; the base commissary and base exchange absorb a large volume of military income that never filters into the local

economy; and the base hospital and medical facilities likewise absorb funds that would normally flow to the local economy if such facilities were not available on base."

To illustrate this point, not all the \$78,604,644 in military payroll in 1989 went into the community. Some went to the Base Exchange, the Commissary, and Nonappropriated Fund activities where \$23,156,318 was spent in 1989. Therefore while approximately 79 million was paid out to military personnel as payroll, only around 53 million is included in the economic impact figure of \$217,385,568.

The economic impact figure can be misleading. For example, payroll for military retirees within the EIR totaled \$31,950,237. However, none of the money these individuals might have spent in the EIR was considered. Also the figure does not include money given to contractors outside the EIR. For instance, the economic impact generated by the base on the EIR in 1987 was \$184,526,324. Since 1987 was the year the MX missiles were introduced and conversion of the Minuteman silos was necessary, a great deal of MX related construction occurred during that year. However, the main contractor for the silo conversions was from North Carolina, outside the 50 mile radius, and therefore not counted.

The Base employs 3,642 military personnel and another 802 civil service personnel. An additional 298 civilians are employed at the base exchanges and Nonappropriated Fund Activities such as the golf course, restaurants, bowling alley, Officers club, etc. Finally during fiscal year 1989, 250 contractors were hired and 57 employees worked on the base at private

businesses such as the credit union, bank, florist shop, optical shop and cleaners. The base estimates that 1,295 secondary jobs were created by the base in 1989.

It is possible to obtain an idea of the effect the creation of the Rail Garrison system will have on the EIR by looking at how the introduction of the MX effected the community. In 1987 the base had 1,202 jobs for contractors and private business. By 1988 this figure had decreased to 267. This indicates a possible boon/bust situation created by the MX's appearance. One positive aspect of the existence of the MX in Wyoming (at least economically) was reported by the Wyoming Trucking Association. As reported in an article in their November/December, 1989, publication nearly 170 miles of state and county highways have been improved as a result of the appearance of the MX. \$33 million in federal funds were used for ten separate projects including 90 road segments. Projects included "...widening and repaving roadways, improving turning radii at intersections and increased clearance and strength of bridges and overpasses to accommodate large vehicles."

A fairly safe assumption, then would be that the construction of the Rail Garrison at F.E. Warren AFB should have at least a short term effect on the EIR. Construction will be completed over a 30-month period with construction manpower requirements averaging around 190 workers per month. During deployment (1992) a peak employment of 626 could be reached. Dick O'Gara of the Center for Economic and Business Data in Cheyenne predicts the effect will be slight and not long termed. Because missiles will no longer be housed in silos scattered throughout the southeast corner of the state but be contained within the Base, side benefits such as the highway construction

mentioned above would be unlikely. And, Base personnel report that the introduction of the Rail Garrison system will have little effect on the number of personnel at the base. In fact, according to O'Gara with the consolidation of the missiles in one site there is a possibility that personnel will decrease.

Perhaps a key concern is if in fact the Rail Garrison will become a reality at Warren the first MX-carrying train was scheduled to become fully operational in late 1992. In fact, Warren was the only base for which funds had been approved by Congress. However, Secretary Cheney has begun a cutback on military installations and placed a freeze on military construction. Sources on the base indicate that the construction of the Rail Garrison will go, but will be later than at first thought and Senator Simpson in a January 29th interview stated that the MX Rail Garrison was a key issue and the funding for it would be available. With the situation as is a definitive answer on the future of the Rail Garrison system would be speculative at best.

There are those in the state who would be happier if the Rail Garrison never materialized. Members of "Wyoming Against the MX", in a story reported in the Casper Star Tribune (12-11-89), called the plan a "dangerous and cockamamie concept that is

militarily destabilizing and a threat to the population". Admittedly, the question of whether or not the Rail Garrison system should become a reality has not been addressed in this paper. Rather, attention was focused on an economic examination of the Rail Garrison and the Base which will house the system. In closing, the introduction of the Rail Garrison at F.E. Warren, while creating a slight, brief effect on the surrounding economy; should have no lasting economic consequences aside from those presented by the Air Base in general.

Resources

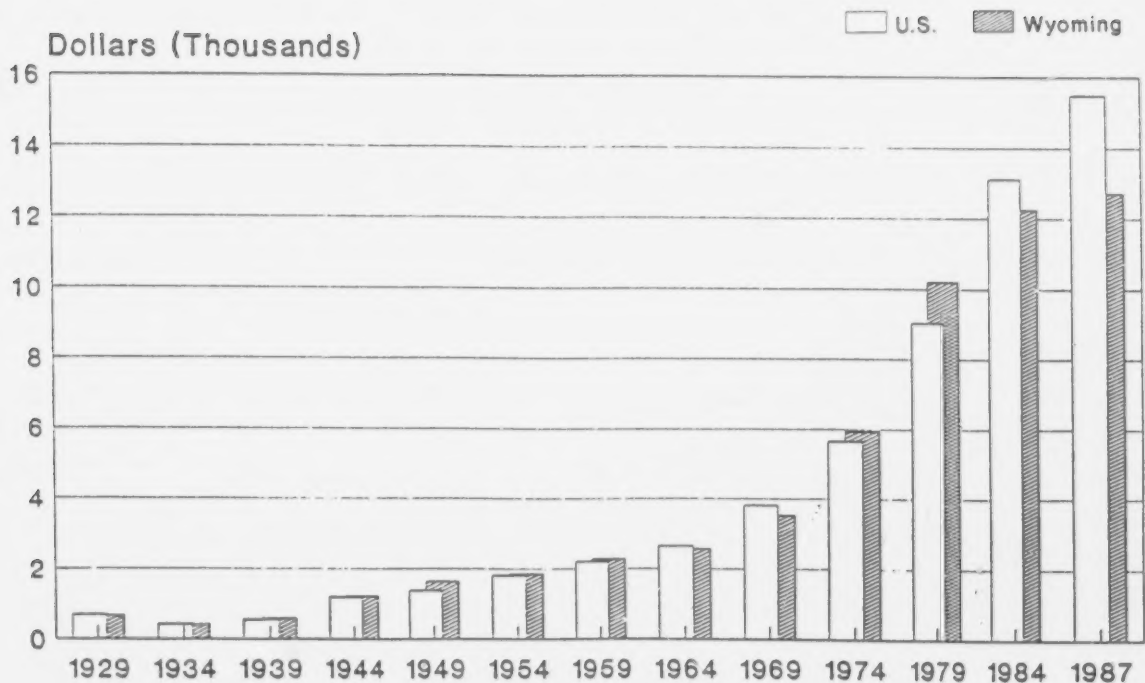
Economic Resource Impact Statement; - Cost Branch, Resource Management Deputate, F.E. Warren AFB. 1989

Laramie County Economic Base Study; Center for Economic and Business Data, Laramie County Community College. 1987

Terry Haven
Editor
Wyoming Quarterly Update

Economic Changes

U.S. and Wyoming
Per Capita Personal Income
Selected Years (1929-87)

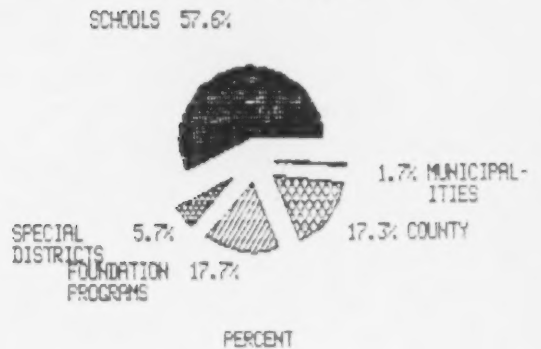


SOURCE: State Personal Income: 1929-87 U.S. Department of Commerce

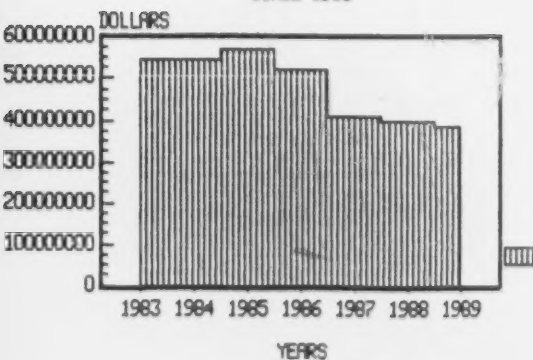
ECONOMIC CHANGES

With April 15th and the IRS looming larger than life for many people these days, it is appropriate to take a look at Wyoming tax trends. Information for these graphs was taken from the 1989 Annual Report of the State of Wyoming Department of Revenue and Taxation. Most noticeable is the downward trend in the amount of ad valorem and cigarette taxes collected in Wyoming.

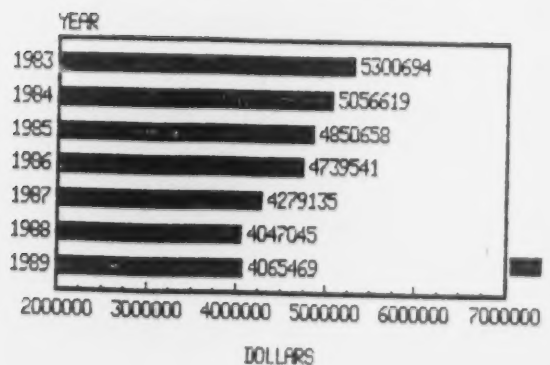
BENEFICIARIES OF PROPERTY TAX
COLLECTIONS IN WYOMING



AD VALOREM TAXES LEVIED
SINCE 1983



CIGARETTE TAX COLLECTION



State Data

Growth of the Decennial Census, 1790 to 1990

Year	Total U.S. population (millions)	Number of enumerators	Total pages published reports	Cost per capita (cents)
1790	3.9	650	56	1.1
1800	5.3	900	74	1.2
1810	7.2	1,100	469	2.4
1820	9.6	1,188	288	2.1
1830	12.9	1,519	214	2.9
1840	17.1	2,167	1,465	4.8
1850	23.2	3,231	2,165	6.1
1860	31.4	4,417	3,189	6.3
1870	38.6	6,530	3,473	8.8
1880	50.2	31,382	21,458	11.4
1890	63.0	46,804	26,408	18.3
1900	76.2	52,871	10,925	15.5
1910	92.2	70,286	11,456	17.3
1920	106.0	87,234	14,550	23.7
1930	123.2	87,756	35,700	32.6
1940	132.2	123,069	58,400	51.1
1950	151.3	142,962	61,700	60.4
1960	179.3	159,321	103,000	71.4
1970	203.2	166,406	200,000	121.8
1980	226.5	n/a ¹	300,000	486.0
1990 (projected)	249.9	n/a ¹	500,000	1,040.4

¹Data are not comparable to previous years due to mail-out/mail-back census.

Source: Margo J. Anderson, *The American Census: A Social History* (New Haven, CT: Yale University Press, 1988) Table 2, Appendix, p. 242. © 1988 by Yale University Press; 1990 figures from Population Reference Bureau, Inc.

Table 4: Agriculture¹

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. Timber Cut in Wyoming National Forests (MBF)	47783.	25572.	20299.	75482.	28080.	5860.	39416.	54863.	23488.	6218.	37522.	46222.
Price Indices ² (1967=100)												
2. Wyoming Crops, Prices Received-Latest	204.	209.	229.	218.	218.	244.	323.	322.	336.	336.	307.	323.
3. Wyoming Crops, Prices Received-Average	206.	207.	230.	218.	217.	234.	302.	323.	325.	335.	327.	317.
4. U.S. Crops, Prices Received-Latest	192.	210.	266.	216.	212.	249.	260.	262.	264.	263.	244.	241.
5. U.S. Crops, Prices Received-Average	192.	203.	223.	217.	214.	230.	262.	260.	265.	269.	250.	245.
6. Wyoming, All Commodities, Prices Received-Latest	261.	263.	304.	268.	301.	260.	313.	292.	314.	297.	308.	297.
7. Wyoming, All Commodities, Prices Received-Average	260.	268.	283.	273.	294.	280.	295.	300.	308.	305.	300.	304.
8. U.S. All Commodities, Prices Received-Latest	222.	237.	235.	232.	237.	253.	264.	265.	272.	267.	261.	270.
9. U.S., All Commodities, Prices Received-Average	222.	233.	234.	235.	238.	246.	263.	263.	270.	250.	264.	267.
10. Wyoming Livestock, Prices Received-Latest	278.	280.	327.	283.	325.	265.	310.	283.	307.	286.	308.	290.
11. Wyoming Livestock, Prices Received-Average	276.	286.	300.	289.	317.	294.	293.	293.	303.	296.	292.	300.
12. U.S. Livestock, Prices Received-Latest	249.	261.	201.	248.	260.	257.	268.	269.	281.	272.	276.	296.
13. U.S. Livestock, Prices Received-Average	250.	242.	241.	252.	259.	259.	264.	267.	277.	273.	276.	287.
14. Prices Paid by U.S. Farmers-Average	327.	331.	336.	335.	339.	348.	352.	354.	359.	361.	361.	365.

¹First time readers of WOU should refer to the "Format" page (in back) for an explanation of abbreviations and table formats.

²The index for the last month (latest) of each quarter, along with the average of the three monthly indices of each quarter.

Sources: Series 1: United States Forest Service. "Timber Cut and Sold, Convertible Products." Region 2 and 4 reports published quarterly.
Series 2-15: Wyoming Crop and Livestock Reporting Service. Bi-weekly Ag Statistics.

Table 5: Banking and Finance

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. Total Bank Loans and Leases Financing Receivables (T\$)	1932753.	1931400.	1779168.	1765203.	1733754.	1787542.	1777474.	1758410.	1740029.	1793438.	1787592.	1782331.
2. Total Bank Deposits (T\$)	3741328.	3740737.	3688191.	3792473.	3671572.	3705311.	3712403.	3753325.	3623495.	3621158.	3633097.	3838377.
3. Total Non-Interest- Bearing Deposits (T\$)	559803.	591011.	582741.	603809.	531243.	564608.	572367.	577610.	525702.	549281.	559276.	64839.
4. Savings and Loan Mortgage Loans (T\$) ¹	810354.	812614.	794162.	772721.	744492.	740954.	726300.	711602.	719240.	696415.	617166.	INA
5. Savings and Loan Deposits (T\$)	1120110.	1104107.	1104332.	1137196.	1119558.	1107268.	1107961.	1070072.	1032814.	988180.	952120.	INA
6. Prime Interest Rate ²	7.50	8.25	8.70	8.75	8.50	9.00	10.00	10.50	11.50	11.07	10.50	10.

¹Only members of the Federal Home Loan Bank Board are included. Indicates amount at the end of the quarter.²Prime rate charged by banks on short-term business loans. Rate is for last month of the quarter.

Sources: Series 1-3: Office of the State Examiner of Wyoming, Abstract Report of State and National Banks in Wyoming, Published Quarterly.
 Series 4 and 5: Federal Home Loan Bank of Seattle, Monthly Report. Comparative Statistical analysis of member institutions.
 Series 6: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 6: Business Conditions

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. New Domestic Corporations	256.	270.	267.	254.	300.	298.	246.	221.	274.	302.	236.	276.
2. New Foreign Corporation	206.	232.	259.	229.	208.	196.	208.	232.	210.	249.	196.	208.
3. Total New Corporations	462.	502.	526.	483.	508.	494.	454.	453.	484.	551.	432.	484.
4. Business Failures	47.	72.	56.	53.	75.	52.	34.	32.	31.	30.	24.	25.
5. Value of Business Failures (\$)	2935220.	5896578.	5918282.	14181020.	11499022.	3906790.	28316376.	36551338.	3120102.	7852143.	3591064.	1998791.
6. Personal Bankruptcies	333.	359.	301.	308.	271.	351.	306.	306.	274.	336.	287.	285.

Sources: Series 1-3: Secretary of State. New and Foreign Corporations. Monthly report.
 Series 4-6: Cheyenne Credit Bureau. Wyoming bankruptcy cases, business failures, and value of failures. Weekly publication.

Table 7: Construction

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
New Residential Dwelling Units	270.	458.	744.	297.	304.	449.	359.	291.	233.	294.	401.	264.
Value of Residential Dwellings Constructed (M\$)	17.6	34.2	59.4	34.3	23.5	37.3	31.3	22.6	18.3	25.1	34.7	23.8
Value of Nonresidential Construction (M\$)	6.8	39.7	23.0	18.2	4.2	35.2	6.9	10.2	11.0	16.1	23.3	20.7
Building Permits Issued in Selected Wyoming Cities	1015.	2841.	3953.	2451.	1489.	2763.	2220.	2082.	1578.	2806.	2663.	1996.
Value of Authorized Construction (T\$)	9083.	23444.	24258.	13633.	15559.	25330.	21878.	18071.	8866.	24528.	22760.	27343.
Mortgage Interest Rate ¹	8.77	9.05	9.03	8.78	8.77	8.72	8.90	9.03	9.66	10.09	9.87	9.70

Conventional first mortgage for new home purchase. U. S. average for last month of quarter.

Sources: Series 1-3: F.W. Dodge Division of McGraw-Hill. "Dodge Local Construction Potentials." Published monthly.

Series 4-5: Survey Research Center. "Local Construction Reports." Survey of authorized construction in selected cities conducted monthly.

Series 6: U. S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 8: Consumers

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. New Truck Registrations	2253.	3155.	3011.	3391.	2867.	3508.	3203.	3227.	3086.	3734.	3775.	3344.
2. New Car Registrations	2211.	3171.	3332.	3027.	2736.	3147.	2969.	2849.	2538.	3341.	3412.	2409.
3. Wyoming Personal Income (M\$)	6166.	6324.	6273.	6383.	6373.	6594.	6519.	6604.	6693.	6826.	6873.	INA
4. U.S. Disposable Income (B\$)	3126.	3147.	3225.	3316.	3376.	3422.	3512.	3587.	3690.	3748.	3807.	3876.
5. U.S. Personal Income (M\$)	3669103.	3723552.	3780493.	3891151.	3926738.	4005952.	4085272.	4194006.	4260250.	4352603.	4433078.	INA
6. Latest U.S. Consumer Price Index (1982-1984=100) ¹	111.0 ²	112.4	113.8	114.2	115.1	116.7	118.5	119.2	120.8	122.8	123.6	124.6
7. Quarter's Average U.S. CPI	110.5 ²	112.0	113.3	114.2	114.8	116.7	117.8	119.5	120.2	122.4	123.3	124.4
8. Liquor Sales (T\$)	5421.	6673.	7616.	8379.	5679.	6714.	7041.	8368.	5530.	6747.	7269.	7746.

¹ Number shown is for the last month of the quarter. CPI shown is the index for wage earners and clerical workers.

² Beginning January 1987, the consumer price index, previously expressed on a base of 1967=100, has been rebased to 1982-84=100. Selection of the 1982-84 period was made to coincide with the updated expenditure weights, which are based upon data tabulated from the Consumer Expenditure Surveys for 1982, 1983, and 1984. Historical data on the new base or additional information regarding these changes is available from the Bureau of Labor Statistics, Washington, D.C. 20212.

Sources: Series 1-2: R.L. Polk and Company Motor Statistical Division. "National New Vehicle Registration Service." Published monthly.
 Series 3,4: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published quarterly.
 Series 5,6,7: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.
 Series 8: Wyoming Liquor Commission. Sales data are reported to SRC.

Figure 9: Employment and Labor¹

Standard Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
Civilian Labor Force	238819.	248444.	242054.	230684.	228734.	232589.	235250.	231426.	226172.	225615.	225475.	224793.
Employment	209316.	226738.	225635.	214312.	209923.	219454.	222072.	216552.	208738.	212474.	212137.	212196.
Unemployment	29503.	21707.	16419.	16371.	18811.	13135.	13178.	14874.	17434.	13141.	13338.	12597.
Unemployment Rate	12.4	8.7	6.8	7.1	8.2	5.6	5.6	6.4	7.7	5.8	5.9	5.6
Initial Claims Filed	13392.	8086.	6386.	9983.	10949.	6888.	5376.	9704.	10334.	6508.	4773.	8659.
Miners' Average Weekly Hours	40.9	40.8	42.7	45.4	42.9	43.6	43.4	42.7	46.3	42.7	43.6	44.0
Miners' Average Weekly Pay (\$)	599.03	602.91	605.87	637.42	625.72	533.42	619.70	627.33	678.68	612.15	611.21	617.14
Miners' Average Hourly Wage (\$)	14.66	14.79	14.19	14.04	14.60	12.23	14.29	14.68	14.67	14.34	14.01	14.02

The most recent year's data are preliminary.

Sources: Series 1-11: Wyoming Employment Security Commission. Labor Force Trends. Published monthly.

Table 10: Energy and Mineral Production

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. Wyoming Coal (TST)	35184.	33887.	39261.	38831.	37323.	39016.	42613.	39032.	39086.	40814.	37918.	INA
2. U.S. Coal (TST)	222892.	219022.	226784.	246314.	231473.	225968.	239329.	239581.	241903.	238674.	216310.	INA
3. Wyoming Oil (TBP)	310.	302.	310.	317.	320.	317.	306.	299.	309.	302.	296.	295.
4. U.S. Oil (TBP)	8371.	8339.	8227.	8347.	8304.	8216.	8033.	7984.	7900.	7860.	7669.	7607.
5. Wyoming Natural Gas (MMCFD) ¹	1453.	1281.	1171.	1203.	1430.	1339.	1135.	1455.	1953.	1274.	333.	INA
6. U.S. Natural Gas (MMCFD)	50801.	45830.	44335.	49241.	50768.	46453.	44547.	48982.	51189.	47405.	45811.	INA
7. Active Rig Counts in Wyoming-Average	23.	27.	47.	61.	40.	33.	43.	31.	20.	22.	43.	50.

¹Beginning with fourth quarter 1986, Wyoming gas includes carbon dioxide production.

Sources: Series 1,2,5, and 6: U. S. Department of Energy, Energy Data Reports. Gas data are from Natural Gas Monthly, and the Wyoming Oil & Gas Conservation Commission. Coal data are published weekly.
 Series 3-4: The Oil and Gas Journal. U.S. and Wyoming Oil Production. Published weekly.
 Series 7: Petroleum Information Corporation, Hughes Tool Company. Monthly Average Active Rig Counts in Wyoming.

Table 11: Government

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. Sales and Use Tax Collections (TS)	39867.	39591.	44922.	47115.	42585.	42769.	449721.	464445.	41823.	42966.	53145.	54618.
2. Violent Crime ¹	299.	325.	435.	354.	354.	371.	431.	308.	310.	278.	323.	INA
3. Nonviolent Crime ²	3955.	4772.	5057.	4420.	3713.	4562.	4662.	3917.	3565.	4423.	4704.	INA
4. Stolen Property (TS)	1880.	2342.	2494.	2199.	1770.	1986.	2467.	2272.	2040.	2617.	2200.	INA
5. Stolen Property Recovery Rate	41.4	35.7	33.1	34.1	42.2	43.1	35.5	36.0	42.8	30.5	44.0	INA
6. Percent of Crimes Cleared ³	32.0	26.6	44.2	34.5	33.7	28.3	30.9	40.0	33.0	27.5	27.	INA

¹Murder, negligent homicide, forcible rape, robbery, aggravated assault.

²Burglary, larceny, auto theft.

³Clearance of a crime indicates resolution of a complaint by arrest or other extraordinary means.

Sources: Series 1: Wyoming Department of Revenue and Taxation, Sales and Use Tax Division. "Net Collections by Business Class by County."

Published monthly.

Series 2-6: Uniform Crime Reporting Center for Criminal Justice Research, Division of Criminal Identification, Office of the State Attorney General. "Crime in Wyoming." Published quarterly.

Table 12: Tourism

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
<u>Visitors, National Parks and Monuments</u>												
1. Yellowstone	75835.	681163.	1692818.	168613.	83736.	649842.	1268270.	216076.	82542.	720021.	1724290.	153523.
2. Grand Teton	141570.	535659.	1486479.	264932.	144982.	624400.	1083754.	223562.	211180.	665734.	1361210.	302539.
3. Devil's Tower	8523.	92700.	215299.	17980.	7121.	109993.	222877.	20702.	8064.	120589.	229668.	19106.
4. Fossil Butte	282.	5082.	13793.	1072.	286.	5894.	13838.	1195.	224.	5565.	13192.	1452.
5. Fort Laramie	1305.	35117.	50167.	4437.	1172.	24364.	49631.	4145.	1475.	20488.	40697.	3007.
6. Big Horn NRA-South ¹	22056.	55064.	70305.	40782.	30045.	60727.	58820.	35558.	14293.	47417.	62160.	185172.
<u>Other Tourism Indicators</u>												
7. Traffic Count (Avg. number of Vehicles/Day)	78349.	116920.	163546.	113385.	88529.	142830.	178675.	118023.	113409.	146663.	184209.	118130.
8. Hotel, Motel, and Camp Sales Tax (TS)	928.	891.	1821.	1871.	947.	1050.	2106.	1929.	954.	1013.	1962.	1951.
9. Gasoline Sales (TCL)	56561.	79620.	98146.	71190.	62295.	81811.	96106.	70784.	61807.	78869.	INA	INA

¹ Big Horn Canyon N.R.A. is only partially in Wyoming. Only visitation for the Wyoming part is shown.

Sources: Series 1-6: Monthly visitor use reports of the National Park Service.

Series 7: Traffic Survey Unit - Planning Branch, Wyoming State Highway Department. "Selected Recording Stations Traffic Counter Data."

Published monthly.

Series 8: Wyoming Department of Revenue and Taxation. "Sales and Use Tax Summary by County by SIC Major and Minor." Reported monthly.

Series 9: Petroleum Association of Wyoming. Monthly Gasoline Gallonage Report.

Calendar Quarters	1/87	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89
1. Residential Electric Connections	177091.	176113.	175745.	175879.	175896.	176333.	177122.	176457.	175841.	175589.	175485.	176197.
2. Residential Electric Consumption (TKWH)	476965.	337943.	291941.	399068.	505669.	351036.	301098.	401776.	688891.	348577.	296588.	418463.
3. Commercial Electric Connections	33355.	33744.	33898.	33780.	33602.	33722.	33846.	33756.	33928.	33997.	34038.	140722.
4. Commercial Electric Consumption (TKWH)	438712.	403123.	419465.	416675.	456190.	420630.	425495.	426766.	467697.	414902.	428705.	449339.
5. Industrial Electric Connections	2989.	2791.	2796.	2764.	2760.	2748.	2921.	2872.	2972.	3104.	3143.	3084.
6. Industrial Electric Consumption (TKWH)	1718924.	1587866.	1740306.	1819191.	1788103.	1815370.	1720051.	1847617.	1812799.	1923513.	1790624.	1968557.
7. Other Connections ²	2801.	3201.	3195.	2680.	2965.	3690.	3899.	3404.	3349.	7440.	4573.	4091.
8. Other Consumption (TKWH)	47998.	51328.	84447.	16355.	10451.	24283.	64994.	13221.	9051.	41364.	102572.	59012.
9. Residential Natural Gas Connections	75206.	74384.	73412.	72654.	74286.	73935.	90673. ³	93300.	100074.	99535.	97665.	90066.
10. Residential Natural Gas Consumption (MCF)	3840399.	1944656.	740699.	2274494.	4310738.	2042533.	826220. ³	2521850.	5786697.	2436947.	871763.	2454142.
11. Commercial Natural Gas Connections	6652.	6617.	6546.	6520.	6643.	6560.	8357. ³	9398.	9422.	9289.	10514.	18913.
12. Commercial Natural Gas Consumption (MCF)	1687452.	939284.	408459.	997247.	1939461.	957241.	475106. ³	1349515.	2981071.	1283967.	631348.	1818451.
13. Industrial Natural Gas Connections	98.	93.	88.	87.	88.	90.	90.	78.	85.	82.	80.	79.
14. Industrial Natural Gas Consumption (MCF)	1129556.	601308.	508551.	828532.	3249154.	482088.	2324709.	2504087.	3069267.	1977830.	2279086.	2611580.
15. Other Natural Gas Connections	37.	37.	38.	35.	39.	36.	35.	34.	36.	36.	34.	33.
16. Other Natural Gas Consumption (MCF)	170.	1225.	7352.	6988.	12922.	1920.	7488.	232.	1216.	4344.	10405.	312.

¹Some small utilities do not report, hence the data are slightly less than actual state totals. The data are consistent. The same utilities' reports are included in each figure.

²Other" includes agriculture, municipal, and other public.

³Starting with third quarter, 1988, the figures for Residential and Commercial Natural Gas Connections and Residential and Commercial Natural Gas Consumption reflect the merger of Northern Gas Division, Northern Utilities Division, and Northern Mountain Gas Company now doing business as Northern Gas of Wyoming.

Sources: Series 1-16: Reports to SRC by selected electric and natural gas utility companies. Survey conducted monthly.

FORMAT

For data available at least quarterly, the last 12 quarters are printed in **WQU**. In this edition, published series begin with the 1st quarter of 1987, and end with the 4th quarter of 1989. For other data series (primarily annual), the most recent observations, up to 12, are published in **WQU**. Quarters are calendar quarters. For example, the 4th quarter is composed of October, November and December. In the table headings and narratives, a particular quarter will be indicated by notation such as 1/87 (1st quarter, 1987), 2/87 (2nd quarter, 1987), and so on.

Beside each data series name is an abbreviation in parenthesis. The abbreviation indicates the units (such as dollars, tons, feet, miles, etc.) of the data. The key to the units abbreviations is below.

Throughout **WQU**, all data are for the State unless otherwise stated. The most recent year's data should be viewed as preliminary, due to revisions. The acronym "INA" signifies that information is not available.

The reader should be attentive to the footnotes at the bottom of pages, particularly those accompanying a data table. The footnotes help the reader to properly interpret the data, and they also indicate when more detailed (by subject or by area) data than that which is shown is available from SRC. A list of sources follows the footnotes.

Key to Units Abbreviations

MBF	-	Thousand Board feet	CWT	-	Hundred Weight
KWH	-	Kilowatt Hours	ST	-	Short Tons
TKWH	-	Thousand Kilowatt Hours	HST	-	Hundreds of Short Tons
\$	-	Dollars	TST	-	Thousands of Short Tons
H\$	-	Hundreds of Dollars	\$/ST	-	Dollars Per Short Tons
T\$	-	Thousands of Dollars	HBBL	-	Hundreds of Barrels
M\$	-	Millions of Dollars	TBPD	-	Thousands of Barrels Per Day
B\$	-	Billions of Dollars	MCF	-	Thousand of Cubic Feet
GL	-	Gallons	HMCF	-	Hundreds of MCF Per Day
TGL	-	Thousands of Gallons	MMCFD	-	Million Cubic Feet Per Day

The Survey Research Center

The Survey Research Center was established in the Summer of 1989. In addition to maintaining the data base used to publish the Update, the Center has the facilities, equipment, personnel and expertise to collect, compute and analyze survey data for both the public and private sector. The Center also serves as the Campus Affiliate Center of the State Data Center in Cheyenne and has information from the United States Census Bureau available.

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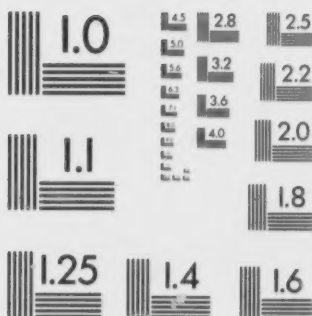
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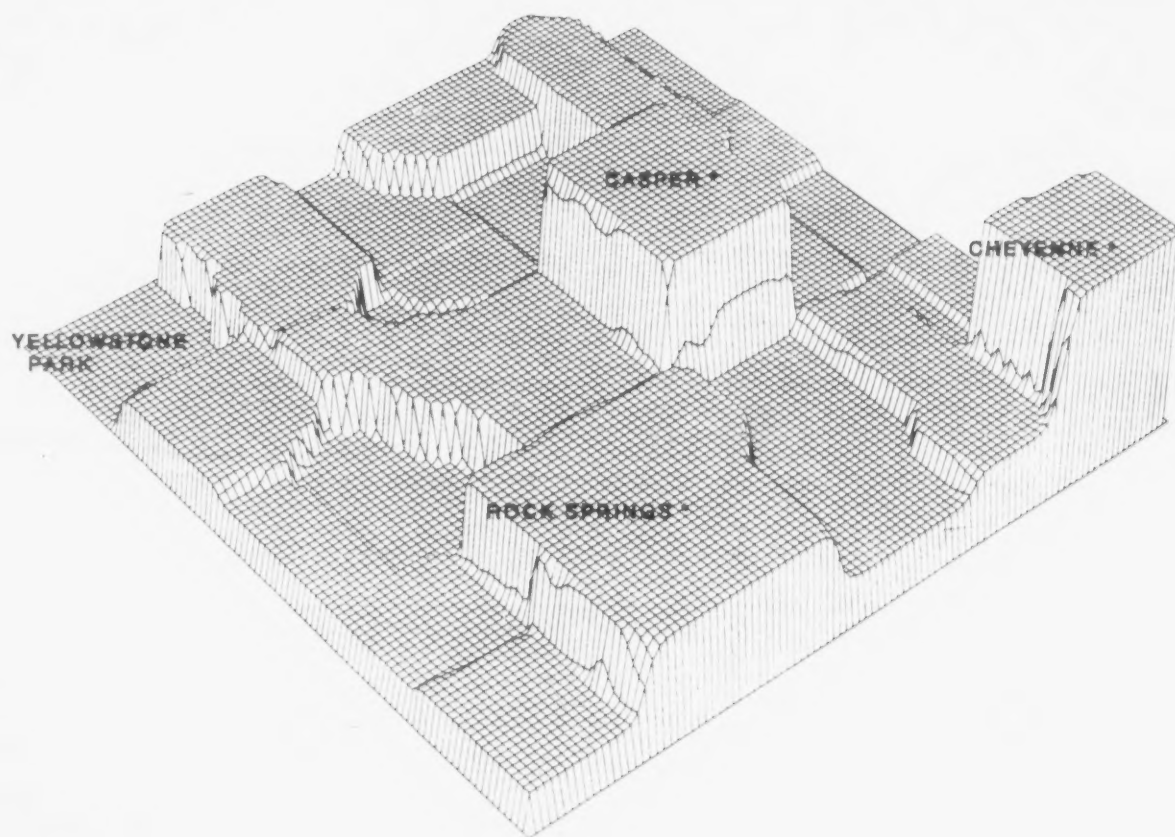
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WYOMING QUARTERLY UPDATE

SPRING 1990

Vol. 9, No.3

 UNIVERSITY OF
WYOMING



SRC

SURVEY
RESEARCH
CENTER

PERSONAL INCOME FOR WYOMING COUNTIES, 1988

SURVEY RESEARCH CENTER
DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF WYOMING

Wyoming Quarterly Update

Wyoming Quarterly Update (WQU) represents the efforts of the Survey Research Center at the University of Wyoming to provide improved data access services. The data presented in WQU are assembled from secondary sources, such as government agencies and private industry. The staff of SRC greatly appreciates the ongoing, helpful cooperation of each of the data sources.

WQU provides current indicators and timely, easily accessible data. Most of the data published in WQU are updated quarterly with the most current numbers. The complete data sets from which WQU originates are maintained, together with documentation by SRC. Readers are encouraged to contact the Center to find out how to gain access to data which do not appear in the WQU. Many data series, such as gasoline sales and taxation data, span more than 30 years. Numerous other series cover 20 years or more.

The cover of each edition features a contour map illustrating the geographic distribution of a particular variable. This edition presents the personal income in millions of dollars for each county for the year 1988. Information was obtained from the Bureau of Economic Analysis. See below for data used in the map. Only 3 counties, Uinta, Sublette, and Lincoln showed a decline from 1987 to their present figures. All other counties increased their personal income with growth ranging from a high of 35.7 million in Natrona County to a low of .10 million in Niobrara County. For more information on personal income trends see the graphs on the divider pages of this issue.

County	Millions	County	Millions	County	Millions
Albany	381.2	Hot Springs	74.2	Sheridan	344.8
Big Horn	126.8	Johnson	85.5	Sublette	68.1
Campbell	489.6	Laramie	1078.3	Sweetwater	598.2
Carbon	240.8	Lincoln	161.2	Teton	240.1
Converse	154.7	Natrona	973.4	Uinta	208.2
Crook	80.6	Niobrara	38.2	Washakie	112.7
Fremont	385.7	Park	333.3	Weston	101.5
Goshen	152.6	Platte	108.4	Yellowstone	0

First-time readers of WQU should refer to the "format" explanations on page 50 for keys on how best to use and interpret data presented in this publication.

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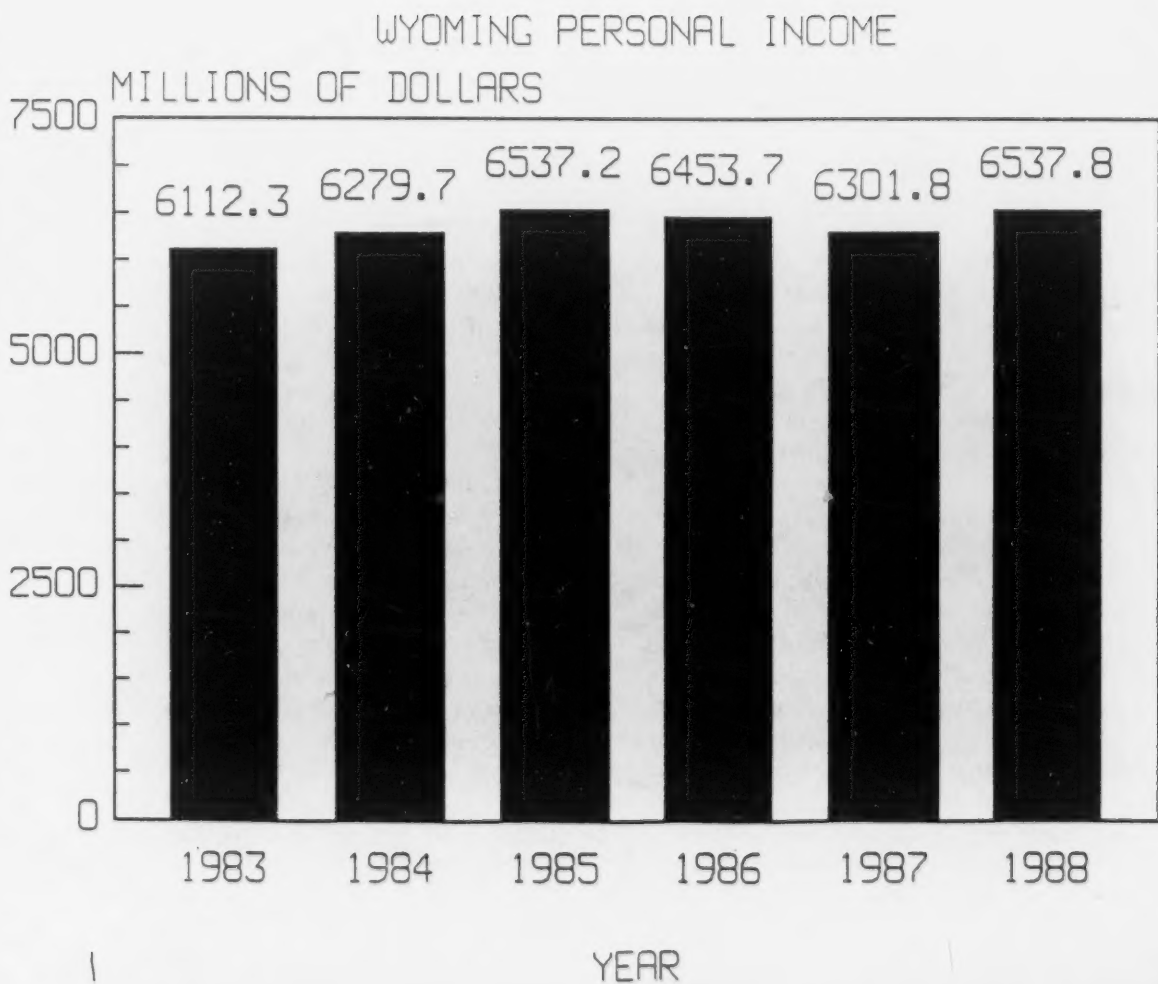
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Wyoming Scene



Overview and Perspective

The Bureau of Economic Analysis (BEA) has released preliminary figures on regional Per Capita Personal Income for 1989. The BEA defines personal income as:

"Personal income is the income received by persons from all sources, that is, from participation in production, from government and business transfer payments, and from government interest. Personal income is the sum of private and government wage and salary disbursements, other labor income, farm and nonfarm proprietors' income, rental income of persons, personal dividend income, personal interest income, and transfer payments, less personal contributions for social insurance. Personal income is measured before the deduction of personal income taxes and other personal taxes and is reported in current dollars (no adjustment is made for price changes). Per capita personal income is the annual total personal income of residents divided by resident population as of July 1".

Per capita personal income in the Rocky Mountain Region grew faster in 1989 than the U.S. average. This was good news for a region where growth had been well below the U.S. average since 1982. However, despite this accelerated growth per capita income in the Rocky Mountain Region in 1989 was still 13 percent below the U.S. average (\$15,316 vs. \$17,567 respectively).

Per capita personal income in this region grew 4.0 percent in 1987, 5.4 percent in 1988, and 6.7 percent in 1989. This compared nationally to 6.0 percent in 1987, 6.6 percent in 1988, and 6.5 percent in 1989. Other trends in 1989 for the Rocky Mountain Region include:

- earnings in private service-type industries grew faster

than the U.S. average for the first time since 1982.

- construction earnings rose after declining in each of the preceding three years.

- farm income picked up after a decline in 1988.

Per capita income increased more in 1989 than in 1988 in each of the Rocky Mountain States except Wyoming. The BEA attributed this slowdown to weakness in mining and durables manufacturing coupled with the fact that construction earnings in Wyoming declined in 1989 for the fourth consecutive year.

While construction earnings may be down, construction itself does not seem to be following the same path. The number of residential units, value of residential constructions, value of nonresidential constructions, number of building permits issued in selected Wyoming cities, and value of authorized construction all increased from the first quarter of 1989.

The number of new corporations, both domestic and foreign, which has seen-sawed over the last several quarters is back on the decline, down from the fourth quarter of '89 as well as a year ago in the first quarter of '89. The number of new domestic corporations for the first quarter of 1990 was 219, this compared with 276 for last quarter and 274 a year ago. Similarly, the number of new foreign corporations was 118, down from last quarters total of 208 and 210 for a year ago.

The tourism industry is gearing up for the summer season on a positive note. The Division of Tourism and State Marketing

reported requests for travel brochures are up 38 percent from last year, with an average of 1000 requests per day. Visitation totals show that while visitors to Yellowstone, Grand Teton, and Fossil Butte fell from a year ago; visitation totals for Devil's Tower, Fort Laramie, and the southern portion of the Big Horns rose.

A report presented by Davidson-Peterson Associates, Inc. at the Governor's conference on Tourism indicated that tourism/recreation brings in more than \$1.5 billion into Wyoming's economy. This includes annual payroll for more than 29,000 jobs (\$575.6 million), state taxes (\$231.5 million), and local taxes (\$53.1 million). Broken down into travel seasons the total amount of tourist expenditures is: January - May, \$343.6 million; June - August, \$804.3 million; and September - December, \$403.9 million.

Unemployment figures for the first quarter of 1990 were fairly stable starting out at 5.5 percent in January, falling to 5.3 percent in February, and rising to 5.9 percent in March. In January all but 5 counties reported lower unemployment from a year ago, with Teton County having the lowest unemployment rate (2.8%) and Fremont County the highest (9.8%). This trend continued in February where Teton again had

the lowest rate (2.2%) and Fremont and Big Horn shared top billing (9.3%). March found Teton County still with the lowest unemployment rate (2.8%) and Lincoln with the highest (10.0%).

Preview of Coming Attractions

- A new carbon dioxide plant in Sweetwater County built by CO₂, Inc. should be operational by mid to late July. The company should create 15 to 30 jobs.

- Coastal Corporation has announced plans to build a Methyl Tertiary Butyl Ether plant at their existing Coastal Chem site in Cheyenne. The plant should employ around 25 people.

Terry's Trivia

In 1988 the total state and local appropriations per student for Wyoming colleges were \$6203 ranking Wyoming third behind Alaska and Hawaii.

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Spring Minerals Update

OVERVIEW

The first quarter of 1990 brought some pleasant surprises in regard to energy and mineral production. Coal production in 1989 was 1.1 million tons higher than our estimate of October 1989. At 171.1 million tons, coal production set another record. Preliminary estimates of 1989 oil production look like there may be as much as 500,000 barrels more than our last forecast. Estimates of natural gas production in 1989 are 48 billion cubic feet or 6 percent higher than our October estimate. 1989 production of trona is also 1.2 million tons more than what was forecast in October.

Higher average posted oil prices in the first quarter of 1990 (up to \$20.10 in January) also provided some optimism and relief although prices did decline overall in the quarter. OPEC actions in April, however, cast a new shadow over what may happen to prices in the second quarter of 1990. Natural gas prices, though volatile, seemed to average higher than 1989. The spot gas price at Opa! was as high as \$2.05 in January. Coal prices really showed little change over 1989 with spot sales still dipping under \$4.00/ton. There was contract activity in both the Hanna and Powder River Basins in the first quarter, and there was some possibility of new contracts in both the Green River Basin and the Hams Fork Coal region.

Oil and gas drilling declined through the first quarter as it traditionally does although there was definitely more drilling than in 1988. Drilling activities were centered in the oil fields of the Powder River Basin

and the gas fields of the Greater Green River Basin. While there is still no Wyoming to California pipeline under construction, the likelihood of one being built has only increased. In addition, two companies announced construction plans. Coastal Corporation plans to build a methyl tertiary butyl ether plant near Cheyenne and CO₂, Inc. is planning a carbon dioxide liquefaction plant north of Green River.

There is also major construction planned in the trona patch. Tenneco and Asahi Glass Co. have announced a \$100 million expansion plan for Tenneco's soda ash plant near Green River. This project will expand Tenneco's operation an estimated 48 percent.

The uranium industry lost another mine in the first quarter of 1990. In this case, Malapai Resources ceased its in situ production in the Powder River Basin. While this left only one producing mine in Wyoming in March, Pathfinder still plans to reopen its Shirley Basin operation in 1990, and other companies are still evaluating their options.

Exploration activities for metals, precious stones, and industrial minerals are also anticipated as the weather improves. In particular, there is already announced exploration plans for gold, copper, diamond, dimension stone, aggregate, and silica sand.

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OIL AND GAS UPDATE

Average posted prices for Wyoming Sweet crude oil in January, 1990, rose to their highest level in over three years. The average price was \$21.10 per barrel. While the average posted price for February, 1990, was only slightly lower at \$20.85 per barrel, the average posted price in March, 1990, dipped to \$19.15 per barrel, which was still significantly higher than it was for March in the past three years. The average posted prices over the past 13 months have been higher and more stable for a longer period than for any comparable period over the past 39 months.

Increased demand for crude oil during January and February of 1990 was partly responsible for the high average posted prices in Wyoming. Refiners across the country bought extra crude oil to replenish their inventories which were very low following the high demand for heating oil and other products during the extremely cold weather in December, 1989. U.S. imports of crude oil and other petroleum products averaged over nine million barrels per day in January. This was the first month since 1977 that exports exceeded nine million barrels a day. Total petroleum imports accounted for a record 54 percent of domestic deliveries in January. Although high demand was partially responsible for the high import total, domestic crude oil production has declined by 1.7 million barrels per day since 1986.

Wyoming's oil production also continued its decline. A preliminary estimate of oil production for 1989 from Petroleum Information (1990a) shows that Wyoming produced 108,541,829 barrels, which should keep Wyoming in sixth place nationally. Wyoming's 1989 production, however, is a

decline of nearly 5.8 million barrels (five percent) from 1988 production. It is unlikely that this decline rate will change dramatically in the next few years.

Even if crude oil prices stay in their current range and well completions increase, there is a lag time between well completions and production. Well completions in Wyoming in 1989 fell to 420 (Petroleum Information, 1990b). This figure will be adjusted upward somewhat when late reports arrive; however, the revised figure will still be much lower than the last four years. When oil prices dropped in 1986, the rig count, well completions, and oil production also dropped. It will take several years of increased drilling and the implementation of major enhanced oil recovery projects to halt the oil production decline.

One type of enhanced oil recovery project (new to Wyoming) that could at least help slow the State's oil production decline is the huff n' puff process (single-well, cyclic, carbon dioxide stimulation). The initial test well in Crooks Gap Field pumped about 1,600 barrels of oil during two months of production after stimulation. Although this first well produced significantly less oil than expected, in two to three months the well will be stimulated with carbon dioxide for a second time. Researchers speculate that the well may produce ten times as much oil in this second test. The 1990 Wyoming Legislature provided funds to the University of Wyoming's Enhanced Oil Recovery Institute to work on the huff n' puff process. Funding is also coming from private industry and the U.S. Department of Energy. Hopefully, this process will be economically feasible for use in other wells around the State and will help boost oil production.

A preliminary estimate of natural gas production for Wyoming (Petroleum Information, 1990a) shows that production reached an all-time high of 863.8 billion cubic feet in 1989 (an increase of 52.2 billion cubic feet over 1988 production). This preliminary estimate, which includes methane and carbon dioxide production, is six percent higher than our earlier estimate of 815 billion cubic feet. Nearly 30 billion cubic feet of the increase over 1988 production was from Fogarty Creek Field. Gas from this field contains approximately 66 percent carbon dioxide. Based on total gas production, Wyoming will probably maintain its fifth-place position as a natural gas-producing state in 1989.

Wyoming's annual gas production has increased over 260 billion cubic feet since 1986 and will continue to increase for years to come as increased gas usage accelerates development of the State's large gas resources. The gas surplus in the United States is fast disappearing as evidenced by spot gas prices at Opal, Wyoming. The January, 1990, spot price was \$2.05 per MCF (thousand cubic feet) while the January, 1989, spot price was \$1.35 per MCF. Although the February, 1990, spot price declined to \$1.50 per MCF, it was still higher than the \$1.35 in February, 1989.

Both WyCal Pipeline Co. and Kern River Gas Transmission Co. claim they have enough letters of intent and signed agreements to proceed with plans to build a pipeline to deliver Wyoming gas to southern California. Although it is still uncertain which pipeline is ahead of the other, it is becoming more certain that a pipeline will be built. Both companies plan to start construction later this year and to begin delivery of gas by late 1991.

In a related item, Questar Pipeline Co., West Gas, and Rocky Mountain Natural Gas announced plans to construct a 300-mile, \$100 million pipeline in Colorado. The TransColorado Pipeline could transport 250 to 300 million cubic feet of gas per day from western Colorado and other producing basins in Wyoming and Utah and connect with existing pipelines to ship gas to markets in the Midwest as well as markets in southern California.

The old Husky refinery in Cody could be reopened this summer if plans by a newly-formed Utah company are finalized. The refinery is slated to employ about 100 people within two years.

The Coastal Corporation announced plans to build a \$65 million plant to produce methyl tertiary butyl ether (MTBE), a gasoline additive that helps reduce air pollution. The plant would employ about 25 people at the Coastal Chemical Inc. site near Cheyenne. Six weeks after the announcement; however, the U.S. Senate rejected an amendment that would favor the use of MTBE over ethanol. It is unknown whether this action will affect Coastal's plans to build their plant.

CO₂, Inc., a Texas company, announced plans to build a \$500,000 carbon dioxide liquefaction plant in Sweetwater County. The proposed facility would be located near Exxon's Shute Creek plant north of Green River and would employ up to 30 people. The expected capacity of the plant is about 240 tons of carbon dioxide per day by late June. CO₂, Inc. will market the liquefied carbon dioxide to enhanced oil recovery projects in and around Wyoming.

Although lease sales are still doing fairly well, the Wyoming Department of Public Land's January sale was disappointing. The March sale, however, was one of the two best sales in the last 15 months. The high per-acre bid at the January sale was only \$46 for a 640-acre tract covering all of section 36, T.22N., R.110W. The lease is about five miles east of General Atlantic Resources' Sugarloaf Butte Field discovery of oil and gas from the Dakota. Yates Petroleum made the high per-acre bid of \$85 at the March sale for a 320-acre tract covering N/2 section 36, T.49N., R.70W. The parcel is about 1/2 mile north of an abandoned Minnelusa oil well in Chalk Hills Field.

The high per-acre bid at the U.S. Bureau of Land Management's (BLM) February sale was \$340 made by Wade Vick for 2,360-acre parcel covering all or parts of sections 22, 23, 26, 27, 34, and 35, T.36N., R.94W., near Fort Union gas production in Fuller Reservoir Field. Only six parcels received bids of \$100 or more per acre in this sale.

Based on company data and on information compiled and published by Petroleum Information, the following significant exploration and development events occurred in Wyoming during the first quarter of 1990:

A. Exxon Corp. has reached total depth at their 1 Rockslide Unit well in SW NE section 12, T.23N., R.118W. The well was drilled to 16,000 feet in the Bighorn Dolomite and is 15 miles north of Exxon's 1989 Collett Creek Field discovery of oil and gas in the Bighorn.

B. Texaco Inc. set production casing at their 1 UPRR 13-Slab Park Unit well in SE NE section 13, T.12N., R.116W. The well

is a 16,000-foot Dakota test located about four miles northwest of Dakota oil production in Graham Reservoir Field.

C. The Taylor Ranch Field area has two new Dakota wells. Anadarko Petroleum completed the 1-27 Taylor Ranch-Federal well in NW SW section 27, T.13N., R.114W., for 1.2 million cubic feet of gas, 120 barrels of condensate, and 40 barrels of water per day. Texaco Inc. completed the 4 TPI-Whiskey Springs well in SW SE section 32, T.13N., R.114W., flowing 1.8 million cubic feet of gas and 662 barrels of condensate per day.

D. Wexpro Co. completed four more producers in Church Buttes Field in the company's development drilling program with Union Pacific Resources. The 69 Church Buttes Unit well, completed in C SE section 17, T.16N., R.112W., flowed 1.07 million cubic feet of gas per day from the Dakota; the 65 Church Buttes Unit well in NE SE section 17, T.17N., R.112W., flowed 5.64 cubic feet of gas, 128 barrels of condensate, and 53 barrels of water per day from the Dakota; the 66 Church Buttes Unit well flowed 1.54 million cubic feet of gas, 41 barrels of condensate, and 22 barrels of water daily from the Frontier Formation; and the 73 Church Buttes Unit well in C SE section 33, T.17N., R.112W. flowed 3.20 million cubic feet of gas and 47 barrels of condensate per day from the Frontier.

E. Amoco Production completed seven new producers as part of their drilling program in Bruff and Fabian Ditch Fields. The 2-Champlin 285-Amoco C well in SW NE section 33, T.20N., R.112W., flowed 21 million cubic feet of gas, 121 barrels of condensate, and 20 barrels of water per day from the Dakota; the 2 Champlin 285-Amoco A well in SW NE section 27, T.20N.,

R.112W., flowed 21 million cubic feet of gas, 202 barrels of condensate, and 14 barrels of water per day from the Dakota; the 2 Champlin 285-Amoco well in NE NE section 35, T.20N., R.112W., flowed 1.8 million cubic feet of gas, 15 barrels of condensate, and five barrels of water daily from the Frontier; the 2 Champlin 149-Amoco D well in NE SE section 21, T.19N., R.112W., flowed 1.99 million cubic feet of gas and 18 barrels of condensate daily from the Frontier; the 2 Champlin 149-Amoco J well in NE SE section 11, T.19N., R.112W., flowed 2.41 million cubic feet of gas, one barrel of condensate, and one barrel of water per day from the Frontier; the 2 Champlin 149-Amoco L well in SE SW section 15, T.19N., R.112W., flowed 25 million cubic feet of gas and 114 barrels of condensate per day from the Dakota; and the 2 Champlin 358-Amoco F well in NE SE section 15, T.18N., R.112 W., flowed 2.64 million cubic feet of gas daily from the Frontier. Together these seven wells had initial flowing potentials of over 75 million cubic feet of gas and 471 barrels of condensate per day.

F. General Atlantic Resources recently discovered Sugarloaf Butte Field. The discovery well, the 30-1 Whiskey Buttes-Federal in NW SW section 30, T.22N., R.110W., flowed 1.46 million cubic feet of gas and 958 barrels of condensate daily from the Dakota. General Atlantic is testing the Frontier at two other wells in the area, the 32-1 Whiskey Buttes-Federal in SW NW section 32, T.22N., R.110W., and the 1-36 Whiskey Buttes-Federal in SE NE section 36, T.22N., R.111W. In the same are, Presidio Exploration is testing the Frontier at the 34-7 Lombard Butte-Federal in NW SE section 7, T.22N., R.110W. The company will attempt to complete the 33-35 UPRR well in SE NE section 35, T.22N., R.111W. in the Dakota.

G. Chevron USA recently completed three development wells in the Birch Creek Field. The 106 BCU well in NW NE section 23, T.27N., R.113W., flowed 10 million cubic feet of gas and 33 barrels of water per day commingled from the Bear River and Frontier Formations; the 105 BCU well in SE SW section 24, T.27N., R.113W., flowed 3.96 million cubic feet of gas, six barrels of condensate, and 62 barrels of water per day commingled from the Bear River and Frontier; and the 107 BCU well in NW NE section 14, T.27N., R.113W., flowed 1.54 million cubic feet of gas and 60 barrels of water per day commingled from the Bear River and Frontier.

H. Celsius Energy and Union Pacific Resources completed a new discovery in the Almond Formation. The 1 Mulligan Draw Unit well in NE NW section 24, T.15N., R.95W., flowed 2.2 million cubic feet of gas daily. The discovery is about four miles northwest of Almond gas production at Dripping Rock Field and was an effort to evaluate the continuation of a depositional trend in the Almond at the Dripping Rock Field.

I. Amoco Production's Frewen Field discovery in the Lakota produced an average of 2.4 million cubic feet of gas daily during its first two months of production in November and December, 1989. The one well field produced a total of 147.7 million cubic feet of gas during these two months. Amoco began drilling a second well in W/2 SW section 7, T.19N., R.94W., and has a location staked for a third well in N/2 S/2 section 6, T.19N., R.94W.

J. Pacific Enterprises Oil Co. set production casing at their 12,000-foot Almond test well, the 10-1 NE Wamsutter in NE NW

section 1, T.21N., R.93W. The well is about four miles from Mesaverde gas production at Monument Lake Field.

K. Amerada Hess Corp. discovered oil and gas in the Muddy Sandstone at their 27-32 Saddle Rock Unit well in NW NE section 27, T.33N., R.86W. The well flowed 67 barrels of water and 289,000 cubic feet of gas daily and is a mile south of Sun Ranch Field which produces oil and gas from the Muddy. The discovery was named Saddle Rock Field.

L. Thermal Exploration discovered Fort Union gas at their 32-28 Badwater II Unit well in SW NE section 28, T.38N., R.93W. The well is in the Shoshoni Field area. Shoshoni Field produced gas from the Fort Union but was abandoned in 1975. The new well flowed 884,000 cubic feet of gas and 40 barrels of water per day.

M. JN Exploration and Production staked a 10,300-foot Dakota test in SE SW section 23, T.48N., R.93W. The company has drilled one Dakota test in NE NE section 14 and has another Dakota location staked in NE NE section 25, T.48N., R.93W.

N. Karlton Terry Oil Co. staked a horizontal test in Thompson Creek Field in NW SE section 2, T.57N., R.67W. in the Muddy Sandstone. The company's 10 Signal Hill well in NE NE section 10, T.57N., R.67W. was a horizontal well in the Muddy and produced an average of 108 barrels of oil per day during six days of production in December, 1989. Vertical wells in Thompson Creek Field are producing an average of seven to 20 barrels of oil per day.

O. McAdams, Roux, and Associates Inc. discovered oil in the Minnelusa. Their 31-28 Cambridge-Federal well in NW NE

section 28, T.53N., R.68W., pumped 630 barrels of oil per day. The discovery was designated Cambridge Field.

P. Brown Operating discovered Jackelope Field with their 1 Jackelope-Federal well in SE NW section 23, T.53N., R.70W. The well pumped 104 barrels of oil daily from the Minnelusa Formation.

Q. Heath Field has a new producing well. Slawson Exploration's 1-4 Miramar-Federal in SW SW section 4, T.52N., R.68W., pumped 442 barrels of oil per day from the Minnelusa.

R. Fancher Oil completed a new Minnelusa producer in Breaks Field. The 26-8 Federal well in SE NE section 26, T.52N., R.69W., pumped 113 barrels of oil and 365 barrels of water per day.

S. Montex Exploration completed a new Minnelusa producer in Art Creek Field. The 8-7 Federal well in SE NE section 8, T.51N., R.67W., pumped 269 barrels of oil per day.

T. Pacific Enterprises Oil Co. completed two more Minnelusa producers in Indian Tree Field. The 43-33 Lois-Federal in NE SE section 33, T.51N., R.70W., pumped 575 barrels of oil per day and the 12-34 Simpson-Federal in SW NW section 34, T.51N., R.70W., pumped 120 barrels of oil and 40 barrels of water daily.

U. There is still a lot of activity in the Fort Union coalbed methane play around the Rawhide Butte Field, which was discovered by Betop Inc. last year. Betop drilled wells in NE SW and NW NW section 20, T.51N., R.72W. and staked locations for wells in section 17 and section 19, T.51N., R.72W. Betop's discovery well was adjacent

to the Rawhide Village Subdivision, which was eventually evacuated because methane was discovered in basements and under the streets of the subdivision. National Cooperative Refinery Association drilled a well in NW SW section 28, T.51N., R.72W. and staked locations in section 28 and section 29, T.51N., R.72W. Martens and Peck Operating drilled wells in SE SE, in NE SE, and in SE NE section 30, T.51N., R.72W. The company also staked locations in sections 30 and 31, T.51N., R.72W.

V. Ampolex Inc. completed a new Minnelusa producer in WD Field. The 11-3 C-T well in NW NW section 3, T.48N., R.71W., pumped 42 barrels of oil and three barrels of water per day.

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COAL UPDATE

Preliminary production figures available from the Wyoming State Inspector of Mines indicate that Wyoming's coal mines

set another all-time high production record in 1989. The 171.1 million short tons produced in 1989 are 7.6 million tons (or 4.6 percent) higher than the previous record of 163.6 million short tons set in 1988. Whether or not Wyoming repeated as the Nation's leading coal-producing state in 1989 will not be known until Kentucky's final coal production is released. Preliminary data indicate that Kentucky coal mines also produced in excess of 170 million short tons in 1989. An estimate of national coal production in 1989 was 974.7 million short tons of which an estimated 384 million short tons came from the western United States. Wyoming accounted for almost 18 percent of the estimated national coal production and about 45 percent of western production.

In 1989, most of the increase in coal production for Wyoming occurred in the Powder River Basin. The Hanna and Bighorn Basins also experienced a slight increase in coal production. In the Powder River Basin, about 7.7 million tons (or 5.4 percent) more coal was produced in 1989 than in 1988 and in Campbell County, 8.1 million tons (or 8.9 percent) more coal was produced. About 88 percent of the State's total production in 1989 was from coal mines in the Powder River Basin. The Green River Basin and the Hams Fork Coal Region both experienced minor decreases in coal production from 1988 to 1989.

Coal production was reported from two of the three underground coal mines in Wyoming in 1989. Nearly 0.5 million tons more coal was produced in 1989 than in 1988 from underground mines, primarily due to increased coal production at Cyprus-Shoshone Coal Company's Shoshone No. 1 mine in the Hanna Basin. Underground coal production

accounts for less than one percent of the State's total coal production.

A total of 27 coal mines reported production in 1989, as compared with 29 mines in 1988. The number of coal mines in the Powder River Basin remained at 17; only the Green River Basin (Sweetwater County) had fewer producing coal mines in 1989 than in 1988. Coal production from the Leucite Hills mine is now reported as part of Black Butte's production (following Black Butte Coal Company's purchase of the Leucite Hills property in 1988). There was no reported production of coal at Arch of Wyoming's Pilot Butte underground mine (formerly Bitter Creek Resources' Stansbury mine) in 1989 because the sale of the mine was not consummated until July of 1989.

The Black Thunder, Jacobs Ranch, Belle Ayr, Eagle Butte, Caballo, Cordero, Rochelle, and Rawhide mines in Campbell County each produced in excess of 10 million tons in 1989. Thunder Basin Coal Company's Black Thunder mine led production with 29.5 million tons. This mine also experienced the largest increase in production (4.7 million tons) between 1988 and 1989. Kerr-McGee Coal Corporation's Jacobs Ranch mine ranked second in production with 14.7 million tons. Seven coal mines in the Powder River Basin and six coal mines in the rest of Wyoming experienced a drop in production from 1988 to 1989.

Employment at Wyoming coal mines increased slightly in 1989, with a net gain of 27 employees (0.6 percent) over 1988. Employment in Powder River Basin coal mines increased by 99 employees (3.6 percent) in 1989, but employment in southern Wyoming decreased. Statewide, employment in underground mines increased by 39

between 1988 and 1989 while employment in surface mines decreased by 12 during this same period.

Deliveries of Wyoming coal to electric utility plants in the last quarter of 1989 were about the same as in the last quarter of 1988. Substantial gains in deliveries for the first two quarters of 1989 account for most of the increased coal production in 1989. Unreported deliveries of 5.8 million tons of coal in 1989 included coal used for industrial and commercial purposes, coal delivered in small amounts for test burns in advance of spot or contract sales, and coal delivered to electric utility plants rated at less than 50 megawatts. Spot sales during the last half of 1989 accounted for about 10 percent of the total coal deliveries. During the last quarter of 1989, however, spot sales accounted for over 15 percent of the total coal deliveries. Of the total coal delivered to electric utility companies in 20 states during 1989, only Illinois, Wyoming, and Arkansas used less Wyoming coal than in 1988. Significant increases in deliveries to electric utility plants in Texas, Indiana, Minnesota, Oklahoma, and Michigan were noted in 1989.

The owners of the Rawlins-based Coalbrik factory, which made compressed coal "bricks" for home heating, recently filed for bankruptcy after failing to raise sufficient private capital to continue in business. Coalbrik had received \$1.25 million in loans from the State of Wyoming under the Amendment 4 economic development loan program in 1987 and had operated a factory in Rawlins that employed 28 people. The bankruptcy action officially places the \$1.25 million loan in default. In October, 1989, the State of Wyoming took possession of the collateral used for the loan, including the Coalbrik building, equipment, and inventory

after the firm fell behind in its loan payments. The employees at the factory were laid off earlier in the summer of 1989.

Developments in the Hanna Coal Field

On the positive side, Arch of Wyoming, Rosebud Coal Sales, and Cyprus-Shoshone Coal Company have all reported some new coal sales or other contract-related activity in late 1989 and early 1990. St. Joseph, Missouri Light and Power Company tested 5,000 tons of coal from the Rosebud mine in late 1989 at the utility's Lake Road power plant. Evidently, the utility will be in the market for purchasing coal sometime this spring. Los Angeles Department of Water and Power, coal buyers for their Intermountain Power Project (IPP) in Utah, have mentioned that they would purchase coal from Cyprus-Shoshone's Shoshone No. 1 mine at Hanna (if it is available) for test burning this summer. Even though the IPP is heavily committed to burning Utah coal, the utility is preparing for situations where additional coal may not be available from Utah coal mines because their production is sold out. Pacific Power and Light Company announced in early January, 1990, that they would be test burning 100,000-ton increments of Hanna Basin coal in the second half of 1990 at the Jim Bridger plant east of Rock Springs. A railcar unloading facility is under construction at Jim Bridger to accommodate unit train shipments of coal.

Several coal sales involving Arch of Wyoming occurred in the first quarter of 1990. In January, Arch sold a total of 100,000 tons of spot coal from their Medicine Bow mine to Illinois Power Company. The coal originated on Union Pacific Railroad with 50,000 tons shipped to the Havana, Illinois, power plant and 50,000 tons shipped to the Wood River, Illinois, power plant. In

February, Arch sold another 50,000 tons of spot coal from their Medicine Bow mine to Central Illinois Public Service Company's Newton Unit No. 2 power plant.

In January, 1990, a new contract between Arch of Wyoming and Kansas Power and Light Company (KP&L) went into effect. The two-year contract calls for Arch to deliver 2.5 million tons of coal from the Medicine Bow mine to KP&L's Lawrence, Kansas, power plant. As much as 150,000 tons of coal per month could be shipped to the Kansas plant on an as(if) needed, as(if) available basis (McGraw-Hill, Inc., 1990a) until 2.5 million tons of coal are sold. The coal shipments will originate on Union Pacific Railroad and terminate on Santa Fe Railroad.

Developments in western and southwestern Wyoming

Los Angeles Department of Water and Power announced that they would also be test burning coal from Arch of Wyoming's new Pilot Butte underground coal mine (north of Rock Springs) at the Intermountain Power Project this summer. Although no coal was produced at the Pilot Butte mine in 1989 and no contracts or sales agreements have been announced yet, Arch plans to produce coal this summer.

Owners of a proposed \$4 billion coal-fired power generating complex in northeastern Nevada, the Thousand Springs power plant, have apparently decided on coal sources for the 2,000-megawatt, eight-unit facility. If the plant is built, coal from both Utah and southwestern Wyoming will be used. Although no coal supply contracts have been announced, the Wyoming coal would most likely come from Pittsburg and Midway Coal Mining Company's Kemmerer mine west of Kemmerer, Wyoming.

Developments in the Powder River Basin Coal Field

Powder River Basin coal appeared to be making inroads into additional distant markets during the first quarter of 1990. In late February, Alabama Power Company (APC) reported that it was testing 200,000 tons of coal from Wyoming's Powder River Basin. Although they did not identify the suppliers, the coal was tested in APC's Miller power plant near Birmingham, Alabama. The coal is shipped by rail to a single unit at the plant; deliveries are expected to continue through May of this year. This is the first western coal burned by Alabama Power.

During the second half of 1990, Niagara Mohawk Power Corporation's (NMPC's) Dunkirk and(or) Tonawanda, New York, plants expect to test coal from the Powder River Basin and(or) the Hanna Basin. Evidently, the utility will blend the western coal with eastern coal to test the feasibility of using blended coals in the event that clean air legislation forces the utility to decrease emissions. NMPC did not announce any details on coal suppliers, transportation methods, or the amounts of coal involved.

Nerco and Arco Coal Companies and a Spanish coal importer, Sociedad Espanola de Carbon Exterior SA (Carbotex), are considering the shipment of Powder River Basin coal to Spain. Test shipments of coal from Nerco and Arco mines in both Montana and Wyoming were scheduled for the first half of 1990. The coal would be test burned in power plants operated by Endesa, Spain's national utility company, as a possible fuel source to replace Spanish lignite, which is currently burned at the plants. The coal would be shipped by rail to the Mississippi River, barged to a terminal on the lower Mississippi, and then loaded on a ship bound

for Spain. Maclean Hunter Publishing Company (1990) reports that the F.O.B. price for the coal at the port will be about \$24.50 per ton. If the test burns are successful, Endesa could purchase from 1 to 3 million tons of Powder River Basin coal per year after 1992.

In January, the U.S. Bureau of Land Management (BLM) announced that the Powder River Coal Production Region of Wyoming and Montana was decertified. This means that BLM's coal activity planning process (operating through the Powder River Basin Regional Coal Team) and the past system of government-initiated coal leasing are replaced by an industry-initiated, lease-by-application process. The Powder River Coal Production Region is the last coal production region in the United States to decertify. Under what has been called a "partial decertification", the Regional Coal team (RCT) remains intact and active by guiding the lease-by-application process, reviewing applications for leases, and preparing operating guidelines for the leasing process. The BLM pointed out that environmental reviews, public hearings, and competitive bidding on proposed lease tracts will still occur and that if industry-initiated leasing increases greatly, the RCT could recertify, if necessary. The leasing-by-application process is restricted to maintenance tracts that would continue or extend the life of a mine. Applications for leases involving new mines or expansions of existing mine facilities would be considered by the RCT on a case-by-case basis.

A damage claim against the Federal government by Whitney Benefits appears nearly settled, pending the Government's appeal motions for reconsideration of the decision by a Federal claims judge. The judge's decision awarded Whitney Benefits

and Peter Kiewit Sons, the coal owner and coal lessee, respectively, a total of \$120 million in damages resulting from the Surface Mining Control and Reclamation Act of 1978 (SMCRA). The plaintiffs in the damage suit claimed that the passage of SMCRA denied them access to and production and revenues from a 1,327-acre, 143-million-ton tract of private coal along the Tongue River north of Sheridan in the Powder River Basin. Because of SMCRA, the coal tract cannot be mined because it is located within an alluvial valley floor. Although the Federal government had offered Whitney Benefits some Federal coal in exchange for the private coal, both Whitney Benefits and Peter Kiewit Sons decided that the Federal coal offered to them was unsatisfactory. The award consisted of \$60 million in damages and \$60 million in attorney's fees and 12 years of accrued interest.

A second item of interest involves a proposed exchange of a scenic easement in Grand Teton National Park for Federal coal in an area north of Sheridan, Wyoming. The U.S. Department of the Interior placed the proposed exchange on hold in February, 1990, pending an Interior Department review. The controversial exchange proposes that a 1,000-acre scenic easement on the JY Ranch property (owned by Laurence Rockefeller) be exchanged for a 200-million-ton tract of Federal coal in the eastern Powder River Basin. The scenic easement, which Rockefeller donated to the Sloan-Kettering Memorial Institute (a cancer research center/hospital in New York City), lies along the shores of Phelps Lake and is surrounded by Grand Teton National Park. If the exchange were made, the National Park Service would receive the scenic easement (which insures that the land would never be developed), but neither the public or the National Park Service would have access to

the property. The Sloan-Kettering Institute would then take possession of the Federal coal, which would pass to private ownership, and the Institute would have the right to mine or lease the coal. The proposed exchange is still under review after several groups, including the State of Wyoming, protested the exchange.

Coal contracts - Powder River Basin

In January, Cordero Mining Company was awarded a contract to supply up to 7.5 million tons of coal to the Lower Colorado River Authority's (LCRA) Fayette Power Project Unit No. 3 (near Austin, Texas) for a conditional period of 5 years. Deliveries from the Cordero mine began in February, 1990, with a \$4.00 per ton F.O.B. mine price. Twenty percent of the \$4.00 per ton base price was set at a fixed rate, but the remainder of the price is subject to escalators based on fluctuations in mining costs (McGraw-Hill, Inc., 1990b). The contract allows LCRA to only buy the coal it needs. LCRA can end the contract after one year or five years, or it can extend the contract an additional five years.

In late February, LCRA opened bids on a solicitation for 223,000 tons of spot coal for Units 1 and 2 of the Fayette Power Project. Published F.O.B. mine bids on the coal ranged from a low of \$3.30 per ton (22.75 cents per million Btu's) submitted by Cordero Mining Company to a high of \$5.15 per ton (29.34 cents per million Btu's). Award of the contract is expected in April with deliveries scheduled between May 1 and December 31, 1990.

Rochelle Coal Company's Rochelle mine in southern Campbell County will furnish from 0.4 to 0.7 million tons of spot coal to Grand River Dam Authority's

(GRDA) Units 1 and 2 near Chouteau, Oklahoma. The contract calls for deliveries from March through December, 1990, via Burlington Northern and Union Pacific Railroads.

Amax Coal Company will sell 175,000 tons of spot coal from their Belle Ayr mine to Wisconsin Power and Light Company's (WP&L) Columbia, Wisconsin, power plant. The coal will originate on Chicago and North Western Transportation Company's (C&NW) railroad and continue on Union Pacific (UP) Railroad and the Soo Line. Another 55,000 tons of spot coal will be delivered to WP&L's Edgewater, Wisconsin, power plant from Rochelle Coal Company's Rochelle mine. This coal will be shipped via C&NW and UP railroads.

During 1990, Thunder Basin Coal Company, a subsidiary of Arco Coal Company, will furnish spot coal to two of Southwestern Public Service Company's (SWPSC) Texas power plants. The Roy Tolk plant northwest of Lubbock, Texas, will receive from 0.1 to 0.4 million tons of coal from either the Black Thunder or Coal Creek mine. The coal will be transported by BN and the Atchison, Topeka, and Santa Fe Railway Company. The Harrington, Texas, power plant near Amarillo will receive from 0.4 to 1.2 million tons of coal from the Black Thunder mine with deliveries via Burlington Northern Railroad.

Cordero Mining Company's Cordero mine will furnish 330,000 tons of spot coal to Dairyland Electric Power Cooperative's Genoa and Alma, Wisconsin, power plants during 1990. Delivery of the coal will be by Burlington Northern Railroad and by barge from St. Paul, Minnesota.

Carter Mining Company, a coal-producing subsidiary of Exxon Coal, USA, has signed a contract with Iowa Public Service to supply up to 1.5 million tons of coal to the George Neal No. 3 unit near Sioux City, Iowa. The 1.5 million tons of coal will be mined at the Caballo mine and is expected to furnish all of the unit's coal requirements for 1990. The coal will be shipped by C&NW railroad.

Kerr-McGee Coal Corporation's Jacobs Ranch mine will supply 30,000 tons of spot coal to Fremont, Nebraska Department of Utilities. This is additional coal to that supplied to the utility in 1989. The utility department is currently considering a five-year, 100,000 to 125,000 ton-per-year purchase for the near future (McGraw-Hill, 1990c).

Amax Coal Company's Belle Ayr mine delivered 6 unit trains (about 66,000 tons) of spot coal to Northern Indiana Public Service Company (NIPSCO) in March, 1990. No specific power plant was mentioned for the purchase, however.

During the months of April, May, and June, 1990, an unspecified amount of coal from the Powder River Basin, Wyoming, will be sold to Georgia Power Company (through their coal buyer Southern Company Services). The utility contracted for a total of 492,000 tons of spot coal for this period, with at least one of the 9 issued purchase orders going to an unidentified Wyoming mine. The remaining purchase orders were for eastern coal. The Wyoming coal will be delivered to the Pride, Alabama, transloader (via railroad to the Mississippi River and by barge down the Mississippi) where it will be placed back on rail cars for final delivery to possibly 6 power plants in Georgia.

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INDUSTRIAL MINERALS UPDATE

Aggregate (Construction)

While production of construction aggregate (sand, gravel, crushed rock, and railroad ballast) is expected to increase in 1990, Meridian Minerals' railroad ballast quarry west of Cheyenne at Granite is apparently decreasing production and several people have been laid off. While it is not clear why Meridian is scaling back its production, pricing competition is a more likely reason than aggregate quality or depletion of reserves. Both the Union Pacific and Burlington Northern Railroads have been

acquiring ballast from other, out-of-state locations.

Cement

Cement is produced at Laramie by Mountain Cement. Their plant was expanded and converted to a dry process in 1988. Currently the plant is using limestone from the Permian-Pennsylvanian Casper Formation (east of the plant), gypsum from a quarry in the Triassic Chugwater Formation (south of the plant site), and shale from a quarry southwest of the plant site. The currently operating shale pit is located in the basal Thermopolis Formation near the center of Sec. 22, T.14N., R.74W. A recently-used shale source is from a pit in the Frontier Formation in the SE 1/4, Sec. 21, T.14N., R.74W. The cement plant has used shale from several rock units in the Laramie area including the Cretaceous Niobrara, Frontier, and Thermopolis Formations.

Dimension Stone

Currently, the Nation's dimension stone industry is centered primarily in the eastern part of the country. Changing economics of the stone industry, however, makes the feasibility of locating a dimension stone industry in a more centrally-located, less populated state such as Wyoming more likely. This may explain why the State Geological Survey has recently responded to several inquiries regarding dimension stone resources in Wyoming.

Dimension stone was produced in Wyoming in the past at several localities. The most famous Wyoming stone is a greyish-brown sandstone of uniform color and texture quarried south of the new State Penitentiary, south of Rawlins. Recently, small amounts of

this material were removed for use in restoring the Frontier Prison in Rawlins, now a historical landmark. This stone was used in the Wyoming State Capitol building, the Union Pacific depot in Ogden, Utah, and in several buildings in Denver, Colorado. Other notable stone sources are a grey granite quarried from Teton Canyon, west of Grand Teton National Park; onyx, marble, and granite from the Hartville uplift and other areas, which were processed at a finishing plant in Jay Em, Wyoming; and a sandy limestone quarried six miles north of Laramie in the Casper Formation, which was used in buildings on the University of Wyoming campus.

Statewide, Wyoming has an amazing variety of stone of all types including granite of all colors; pink, grey, brown, and white marble; quartzite (classified as "sandstone" by the stone industry) of all colors including purple, several shades of green, and several shades of red; and other types of rock such as limestone and onyx. One Wyoming rock, a brown "marble" from the Bighorn Basin was featured in the February, 1990, issue of Dimensional Stone.

As part of an ongoing project, the Industrial Minerals Division of the Geological Survey of Wyoming has prepared over seventy cut and polished samples of decorative rock from Wyoming, some suitable for dimension stone. These samples are available for inspection in the Geological Survey building in Laramie. Interested persons should call Ray E. Harris at (307) 766-2286.

Gypsum

According to figures released by the U. S. Bureau of Mines, U. S. production of gypsum in 1990 is ahead of first quarter production in 1989. In Wyoming, gypsum is

produced at two plants in the Bighorn Basin (near Cody and at Himes, between Lovell and Greybull). Production at these plants is continuing at levels near capacity. Because there are no expansion plans for these plants, gypsum production in Wyoming should increase only slightly or remain constant in 1990. These plants produce wallboard that is marketed regionally and in the Pacific Northwest. Gypsum is also mined near Laramie by Mountain Cement for use in producing cement (see Cement).

Limestone

Crushed limestone is the preferred rock for use as road-surfacing aggregate and sub-base material on Wyoming highways. Nebraska also uses Wyoming limestone on some roads in the western part of that state. Limestone from the present Fisher Industries (formerly Summit Materials) quarries east of Newcastle has been used on highways as far away as Wyoming Highway 59 between Wright and Bill. Seasonal increases in the production of limestone aggregate will soon begin as the weather warms and the snow melts.

Limestone used in the refining of sugar beets is known as sugar rock. A few readers have asked just how the limestone is used. The following discussion (Great Western Sugar Company, undated) is a simplified explanation:

The sugar rock (limestone, CaCO_3) is heated in kilns (with or without coke, depending on the kiln) at the sugar beet refining plants to produce lime (CaO)(also called burned lime by sugar processors) and carbon dioxide gas (CO_2). Beet juice

produced from raw, washed sugar beets is filtered and mixed with burned lime to produce a substance called milk of lime. This material is piped to another tank where carbon dioxide gas from the kiln is added to give the beet juice the proper alkalinity (CO_2 increases the pH and buffers the solution). This results in the precipitation of a limy material containing impurities. The resulting juice is sent to a processing vat where the limy precipitate containing impurities is removed from the juice. The precipitate is washed once to remove any sugar, and the washed sludge, which consists of a mixture of limy and organic materials, is dried and stored in a yard at the plant. More carbon dioxide gas from the kiln is added to the clarified beet juice, a limy impure material is again precipitated, and the sludge goes to the yard. The remaining clarified juice is then processed using several steps to sugar.

The limy material that is stored at several regional sugar beet plants may have some use as a source of lime. If the material is heated, the organic impurities are burned off, producing a fairly pure lime. This lime could be mixed with another waste product, such as fly ash from coal-fired power plants, to produce concrete.

Other lime used in Wyoming is purchased from commercial lime producers in neighboring states. Wyoming does not currently produce any commercial lime.

Phosphate and Phosphate-based Fertilizer

While no phosphate is produced in Wyoming, phosphate from a mine north of Vernal, Utah, is transported by slurry pipeline to Chevron Chemical Company's fertilizer plant near Rock Springs. The phosphate is combined with sulfur from Wyoming to produce fertilizer. Chevron's slurry pipeline is currently the only phosphate slurry pipeline in the United States. Recently, however, J. R. Simplot Co. announced plans to construct a phosphate slurry pipeline from a mine north of Soda Springs, Idaho, to their fertilizer plant north of Pocatello.

Silica raw materials

Exploration of a silica rock deposit near Cassa, in Platte County, continues. This exploration began after publication of a Geological Survey of Wyoming Report of Investigations (Harris, 1988). The company currently developing the deposit cored over 1,500 feet of rock in December, 1989, and January, 1990, and has increased the reserves of high-silica rock to over 100 million tons. The company is still investigating power sources, water availability, and markets for anticipated silica products.

In addition, the Town of Lovell, with geological assistance from the State Geological Survey and financial assistance from the Wyoming Economic Development and Stabilization Board, has begun an investigation of a deposit of very fine-grained, high-purity silica north of Lovell in Big Horn County.

Sulfur

Sulfur is produced in Wyoming as a by-product of the processing of sour natural gas and some oils. In the U.S., Wyoming is now a substantial producer of sulfur, as evidenced by Table 9, which shows Wyoming as the second or third largest producing state in 1989, depending on the type of production.

Although the demand for sulfur is still increasing nationally, the price has leveled off. Increases in sulfur production in Wyoming depend on increased throughput in the State's sour gas processing plants. Since there are no significant increases in sour gas throughput anticipated in 1990, annual sulfur production in Wyoming should remain at about 1.21 million tons.

Trona

First quarter demand for Wyoming soda ash, which is produced from mined trona, indicates another record year is in the making. The increases in demand are related to the manufacture of sodium cyanide for use in gold refining, the substitution of soda ash for caustic soda in many industrial processes, and growth in export markets. The best potential for even greater demand still lies in exports.

Other related news in the first quarter of 1990 includes a joint venture agreement between Tenneco and Asahi Glass Co. of Japan. This agreement will result in new construction and additional production capacity (about 48 percent) at Tenneco's soda ash plant near Green River. In addition, the agreement should result in the creation of 100 new jobs. The permitting processes for the new expansion are expected to take about six weeks.

There is another area of the world in which there are bedded trona deposits similar to those in Wyoming. In Turkey, at Beypazari, near Ankara, trona occurs in bedded deposits over 75 feet thick. Since the host rock is the Miocene Hirka Formation, these deposits are somewhat younger than the Wyoming deposits.

The Turkish deposits have the potential to compete with the producers of synthetic soda ash that currently serve markets in western Europe, in the Middle East, and in northern Africa. Several of these producers of synthetic soda ash may have canceled expansion plans, anticipating future development of this resource in Turkey. The development of the Turkish deposits will affect Wyoming only in that the markets in western Europe, the Middle East, and northern Africa are now a less likely future expansion for Wyoming soda ash (Dundar, 1988).

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URANIUM UPDATE

The order of rank for uranium-producing states has changed considerably in recent years. Wyoming and New Mexico, which held the number one and two positions for many years, have dropped to fourth and fifth, respectively. It also appears that New Mexico's only uranium mine may have closed in 1990.

While there were two in situ producers of uranium in Wyoming during the last quarter of 1989, only one remains in the first quarter of 1990. Power Resources (London Central Energy), which purchased the Highland in situ operations from Sparkling City Uranium (formerly Everest Minerals) is still operating. Malapai, despite last quarter's optimism, ceased production at Irigary Ranch - Christiansen Ranch in January of 1990.

Kennecott, which is partly owned by RTZ, of Great Britain, is taking a \$1 million look at the properties of U. W. Energy-Crested Corp. south of Jeffrey City, beneath Green Mountain. Rio Algom (a subsidiary of RTZ) and Uranerz, U.S.A. are still evaluating solution mining near the Bill Smith property in the southern Powder River Basin. Rio Algom, incidentally, is a major Canadian uranium producer. Pathfinder (COGEMA) is stripping overburden from a new ore body in the Shirley Basin and plans to resume production this summer.

What is the future of the uranium mining and milling industry in the United States and Wyoming? These topics were discussed at a uranium workshop held by the U. S. Geological Survey in Denver in March. The general consensus was that the industry is in bad shape and getting worse. Representatives from the U. S. Department of Energy did point out that because the domestic uranium stockpile is getting smaller, nuclear power plants will soon begin ordering new uranium. However, several industry people (including a representative from NUEXCO) noted that there is no incentive (including price) for utilities to buy domestic uranium. With the U. S. - Canada Free Trade Agreement in effect, it is probable that uranium producers will buy Canadian uranium. Subsidized or not, Canadian deposits are higher grade and larger than those discovered to date in the U. S., and their mining costs are much less than for a typical U. S. deposit. Also, due to the present demise of the domestic industry, there is not exploration for large, high-grade deposits in the United States. In Wyoming, for example, there are several uranium occurrences, similar to the Canadian deposits, none of which have been explored by drilling.

There was another alarming note at the uranium workshop. The Soviet Union, which has been stockpiling uranium mined in the USSR and formerly communist eastern Europe since the early 1950s, has begun selling it on the world market. The fear is that they may need cash badly enough to sell their uranium far below the prices needed by other uranium producers. There is also a fear that the Soviet Union may have stockpiled enough uranium to supply the world's nuclear power plants for decades.

It is most likely that the price of uranium (which is already below \$9.00 per pound of U_3O_8) will continue to fall. In this case, many of the remaining U. S. producers will go out of business. Particularly susceptible are the conventional and in situ producers with no foreign commitment for production. In Wyoming, the recent closure of Malapai Resources' in situ operation is an example.

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METALS AND PRECIOUS STONES UPDATE

Weather generally precludes much field activity in metals and precious stones in the winter and early spring of any year, and 1990 was no exception. The Metals and Precious Stones Division of the State Geological Survey, however, did respond to inquiries from mining companies during the first quarter. As a result, several companies indicated their intent to fund exploration projects for both gold and copper in Wyoming. Thus, barring any major setbacks in the world's economy and metal prices, Wyoming should see a moderate increase in exploration activity this year.

Precious Stones

Exploration for diamond deposits is expected to resume this summer. The Geological Survey of Wyoming is planning to continue its search in the Laramie Mountains for indications of diamondiferous kimberlite and lamproite. Examinations of samples collected last year continued over the winter months. The project will be expanded to the Medicine Bow Mountains if funding is available. Diamond exploration by a mining company is also expected to resume in the Bighorn Mountains.

Seminole Mountains

The Geological Survey of Wyoming is still evaluating the mineral resources of the Seminole Mountains. Laboratory work on samples collected in 1989 continued through the first quarter and field work should resume late in the second quarter of the year. This will be the second year of this project.

South Pass

Wyoming's greatest source of gold and iron ore has been the South Pass greenstone belt located at the southern tip of the Wind River Range of western Wyoming. This belt of greater than 2.8-billion-year-old metamorphosed volcanic, plutonic, and sedimentary rock was investigated by the Geological Survey of Wyoming between 1984 and 1989. During this time, the State Geological Survey identified many dozens of gold anomalies and occurrences; some copper, silver, tin, tungsten, chromium, and nickel anomalies; and some iron deposits. Eight 1:24,000-scale maps completed by the State Geological Survey were recently compiled into a full-color, 1:48,000-scale geologic map, which shows mines and gold-bearing shear

zones (Hausel, 1990a). A final report on the district is nearing completion.

Gold has been of highest interest in the region. For example, gold anomalies ranging from a trace to 105 ppm (3.05 ounces/ton) were identified in narrow shear zones. Some wide, low-grade, mineralized deposits were also located. A 97-foot-wide zone of mineralized wallrock at the Carissa mine averaged 0.8 ppm (0.02 ounce/ton) gold. This 97-foot-zone encloses a 3- to 6-foot shear zone which assays 5.1 to 10.2 ppm gold (Hausel, 1989).

Mineral Hill district, Black Hills

The Tertiary intrusive complex at Mineral Hill, Wyoming, was sampled by the Geological Survey of Wyoming last fall. Samples from the Treadwell open cut along the northwestern flank of Mineral Hill were anomalous indicating the presence of two, parallel, horizontal, gold- and silver-bearing quartz veins in trachyte country rock. Assays for these veins were reported to contain 0.360 ppm to > 10 ppm gold and no silver to > 300 ppm. Follow-up analyses from sample TW4-89 (a limonitic quartz vein) contained 130 ppm gold (3.79 oz/ton) and 330 ppm (9.62 oz/ton) silver (Hausel, 1990b).

Alkaline and ultramafic alkaline rocks

At the turn of the year, the Geological Survey of Wyoming released a study of alkalic and ultramafic-alkalic igneous rocks found in the North American, Russian, and Siberian platforms (Erlich and others, 1989). The study was initiated in the Soviet Union by E. I. Erlich and I. A. Zagruzina, and later completed as a cooperative study

with members of the Geological Survey of Wyoming. The report contains isotopic information on numerous alkalic complexes in each of the three platforms.

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Wyoming Agricultural Outlook

The agricultural outlook for this summer appears more positive and stable than for the past three years. Weather uncertainty, for the first time in recent years, is not a dominant concern, either in the United States or worldwide. The United States Department of Agriculture (USDA) projections for the 1990-91 season indicate that world wheat production could set a record. World coarse grain is also forecasted to rise, although supplies will continue to remain tight and world trade may drop.

Food prices for 1990 are expected to average 3 to 5 percent higher than in 1989. In the first quarter, the consumer price index for food jumped at an annual rate of 13.7 percent. Much of the blame, however, was due to the December freeze in Florida and Texas which caused fruit and vegetable prices to move sharply upward. Additional shocks to the food supply system are unlikely, and food prices are expected to decline for the last three quarters of the year.

Farmland values are expected to rise 3 to 4 percent across the United States in the coming year. This forecast incorporates expectations of near-record net farm income, slightly lower interest and inflation rates, and trends in farmland values. U.S. farmland values rose for the third consecutive year in 1989. However, because 1989's inflation rate was nearly 5 percent, real farmland values actually slipped slightly from a year earlier. Real values of agricultural land has remained virtually flat since 1987.

GRAINS OVERVIEW

USDA's first projections for the 1990-91 season show that the world wheat output could reach a record 568 million metric tons

(MMT), 6 percent over a year earlier. Weather this winter was favorable through much of Northern Europe, China, and the USSR. Soviet wheat output is forecast to reach 95 MMT, up 5 percent from a year earlier. U.S. production could be the third highest ever, at 73 MMT (2.692 billion bushels). Production is forecast to be up in Argentina, Canada, the EC, and the U.S. As a result, the U.S. average farm price is expected to slide to \$2.90-\$3.30 a bushel, down from 1989-90's \$3.71. Additionally, U.S. carryover stocks are expected to rise if projections materialize. World trade in wheat should increase only slightly because of larger production in the wheat importing countries.

World coarse grain production also is forecast to rise, but trade may drop because of more feed use of wheat. U.S. corn production is projected at 8.1 billion bushels (206 MMT), up 8 percent from last year's 7.5 billion and 64 percent greater than 1988's 4.9 billion bushel drought affected crop. Many areas across the Corn Belt are anticipating record or near-record output per acre. However some portions of the country remain quite dry, including parts of Nebraska and Iowa.

Even modest rebuilding of feed grain stocks in the U.S. is unlikely in 1990-91. Exports are expected to remain high, while feed and residual use may increase. Carry-over stocks at the end of the 1990-91 marketing year are anticipated to be far below recent years, and perhaps only one-fourth of the 4.9 billion bushels in 1986-87.

LIVESTOCK SITUATION

Livestock prices have exceeded most analysts projections for the first quarter of

1990. The strength of fed cattle prices carried through the first part of May, and June prices have moved higher than expectations. Feeder cattle and calf prices continued to equal or exceed year ago price levels, as generally improved grass conditions coupled with reduced supply have put grass type steers and heifers at a premium. Hog prices moved counter seasonally higher in April and have maintained this strength into late spring.

Reduced fed cattle marketings during the winter quarter and early spring, plus rising numbers of heavy weight cattle on feed, indicate larger fed cattle marketings in the summer months. Fed cattle prices likely will decline from early June levels.

First quarter fed cattle marketings declined 1 percent from a year earlier, even though the early January cattle-on-feed inventory rose 3 percent. Last fall, many light weight stocker cattle were forced into feedlots because of poor wheat pasture conditions on the Great Plains. These cattle have required more days on feed to reach market weight and grade.

Fed cattle marketings during the spring and summer quarters are expected to exceed last year and could set a record. Large numbers of heavy steers (900 pound and over) and heifers (700 pounds and over) support spring-quarter marketing intentions of 6.1 million head, up 1 percent from last year. However declining steer and heifer slaughter weights suggest that feedlots are current in their marketings.

Beef production during the second quarter is expected to increase to 5,850 million pounds, 1 percent above a year earlier. Increases in fed steer and heifer slaughter probably will more than offset a seasonal decline in cow slaughter. Retail choice beef prices set a record in April at

\$2.85 a pound, 6 percent above a year earlier. As we move into the summer, live and wholesale prices are expected to decline faster than retail beef prices.

Higher hog prices in recent months have boosted cash receipts above total costs, providing an incentive for producers to expand breeding herds and increase farrowing intentions. Year-over-year gains in pork production are expected by fourth-quarter 1990, and output will likely continue to increase into 1991.

Higher wholesale prices pushed retail pork prices to a record \$2.01 per pound in April. Monthly retail pork prices may go higher in coming months, reflecting strong wholesale prices. U.S. pork imports fell about 15 percent in the first quarter, mostly because of reduced imports from Canada, Denmark and Poland. But, higher U.S. prices and larger Danish production could increase U.S. imports over last year in the second half of 1990.

Barring any problems in the feed grain complex that would push feed prices higher, weaned calf prices should equal prices received in the summer/fall of 1989. Supplies are still short, as the total cattle inventory remains 25 percent below the record high numbers of 132 million head recorded in 1975. It is anticipated more heifer calves will be kept back for future placement in the breeding herd, thus adding additional strength to the feeder cattle market. This price strength should carry through the fall of 1992, before increased supply of cattle will begin to negatively impact the feeder cattle market in real terms (after inflation is considered).

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Job Openings Outlook

LAWYERS

Lawyers advise clients of their legal rights and obligations and represent them in courts of law. They often negotiate out-of-court settlements, represent clients before government agencies, prepare legal documents such as contracts and wills, and act as trustees or executors. An attorney's day may include doing research in a law library, studying public records, interviewing clients and witnesses, and writing legal arguments. A small percentage of the time is actually spent in a courtroom, and some lawyers rarely appear in court. After years of practice some lawyers become judges or magistrates. Judges, and to some extent magistrates, preside over a court of law. Their responsibilities may include advising participants in court cases as to proper legal procedures, examining evidence, and managing the court system's employees.

Lawyers must have the ability to write and speak well, ability to reason and analyze well, ability to work with people, and the ability to influence others. Lawyers often sit for long periods of time while doing research, writing legal documents, and talking to clients. They usually work long hours under pressure when preparing cases. Lawyers often start as assistants or law clerks for lawyers and judges.

Lawyers must be licensed by the state bar to practice law. Those with a high academic standing, knowledge of the community, and some experience fare best.

This is a medium-sized occupation, with about 1,370 resident lawyers in Wyoming. An additional 535 non-resident lawyers are licensed in Wyoming. Salaries vary with employment setting and size of clientele. Starting salary ranges from \$18,000-24,000 per year. Maximum wage varies tremendously. For lawyers in private practice, salaries range

from \$45,000-60,000 per year. Lawyers employed by corporations earn from \$60,000-100,000 per year.

Currently, there is a slight surplus of applicants in Laramie, Cheyenne, and Casper. Opportunities may be better in small towns. The outlook for lawyers depends on many factors such as intensity of law enforcement, level of economic activity, number of law school graduates, cost of legal services, and replacement of lawyers leaving the profession. At present, economic conditions restrict opportunities. Some small improvements will permit the profession to comfortably absorb many law school graduates in this region. Currently, competition for jobs is keen. Use of advertising and specialization may slightly improve the outlook in the future. Opportunities may be better for those who have skills such as accounting, scientific knowledge or a foreign language. The number of new graduates along with qualified lawyers seeking new jobs should continue to outnumber openings and competition will remain intense.

SOCIAL SCIENTISTS

Social scientists study human behavior and environments to increase knowledge and to solve societies' problems. Economists study how man uses resources such as land, labor, and capital. Anthropologists analyze the cultures of various people. Political scientists study the theories and organizations of governments and attempt to explain the political behavior of individuals. Historians describe and interpret people and events of the past and present. Sociologists study the behavior and relationship of groups to individuals and society. Geographers deal

with the distribution of people, land and water masses, and natural resources. Market research analysts investigate the wants and needs of the buying public. Social program planners analyze community needs and design programs to help solve social problems.

Social scientists must have the intellectual capacity to understand basic principles and methods, ability to reason and analyze as well as to relate to people, objectivity and good verbal ability, general knowledge of research techniques, and the ability to work independently and conscientiously.

Employers prefer individuals with a master's degree. A bachelor's degree plus years of experience is acceptable by some employers for entry-level positions. Research and teaching positions require a doctoral degree. Many employers indicate a preference for those who can work independently with minimum supervision.

Wages vary depending on field, experience, and employer. Entry level wages for social scientists with a bachelor's degree range from 12,400-18,000 per year. Entry

level salaries for social scientists with a master's degree range from \$17,400-22,000 per year. Top salaries for scientists with advanced degrees and extensive experience range from \$30,000-50,000 per year.

Currently a balance to slight surplus of applicants exists in most fields. Since social scientists are largely employed by public institutions and programs, the employment outlook is determined by public interest and financial support. In Wyoming, limited funding for all social sciences has decreased job opportunities. There are a limited number of positions for historians in Wyoming due to a decrease in the amount of federal funds allocated. Sources report that increased awareness of socio-economic phenomenon and government rules regarding impact statements could favorably affect demand for social scientists in the future. Competition is keen and opportunities are best for graduates with advanced degrees, solid work experience, volunteer-related experience, and geographic mobility.

Suzanne McGuire
Research Assistant, WCIS

Census '90: What to Expect

While the Census Bureau does not deliver the final population totals for each State to the President until December 31, 1990; the Bureau hopes to confirm the following trends from 1980 to 1990:

- Population growth will experience a slowing trend to about 1 percent a year.

- The population is getting older with a median age of 33 (compared to 30 in 1980), and a 26% increase in individuals 65 and over.

- Family and household size are declining (3.29% to 3.16% and 2.76% to 2.62% respectively), and nonfamily households are growing twice as fast as family households.

- Metropolitan areas are growing faster and the migration to the South and

West by individuals from the Northeast and Midwest will continue but at a slower rate.

- The 1990 Census should be the first to show a decline in homeownership since the 1940 Census.

- The number of mobile homes will be double their numbers in the 1990 Census.

Two weeks after Census Day (April 1, 1990) only 58% of Wyoming's residents had returned their mail-back census forms. This compared with 61% nationwide. For each percentage point of mail-back forms not returned the country pays an additional \$10 million dollars so if you have not returned your form, please do so soon. If you feel you have not been counted you can call this toll free number, 1-800-999-1990.

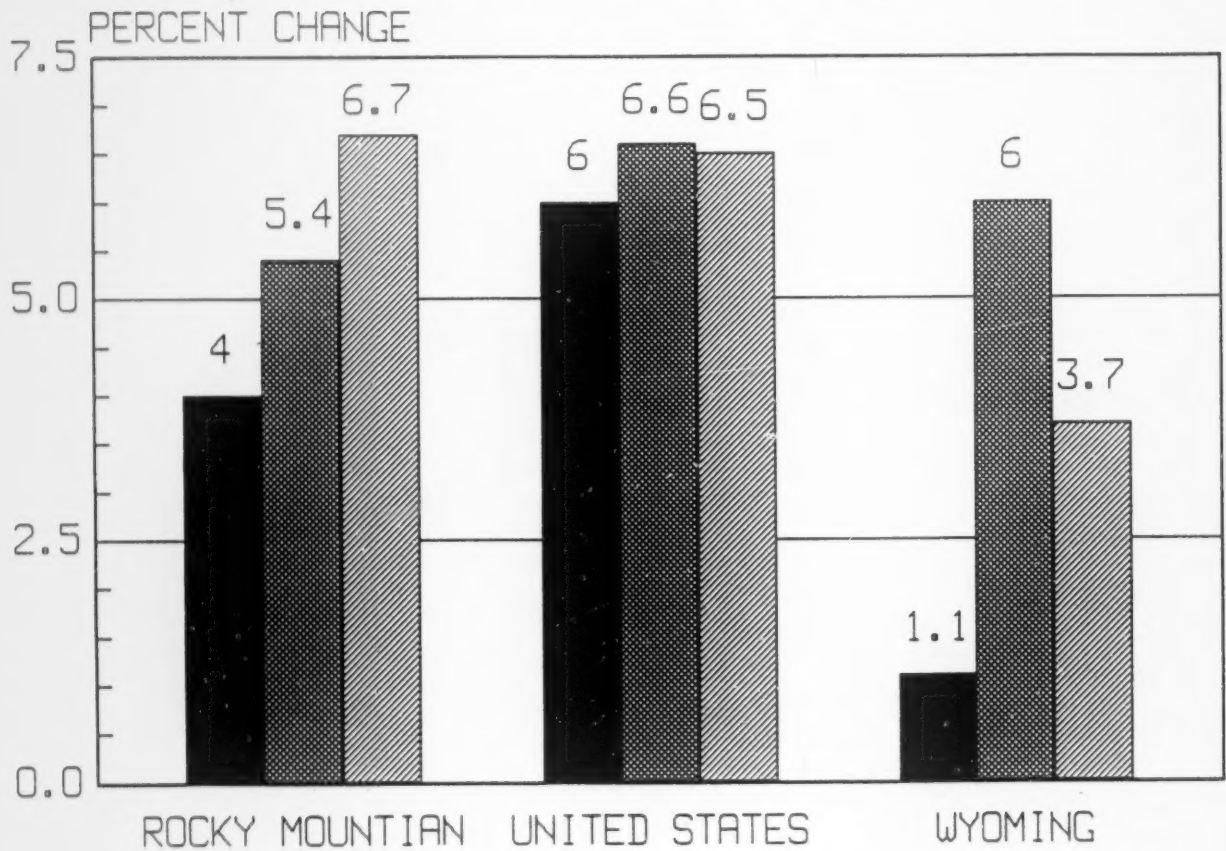
CENSUS '90



***Answer the Census.
It Counts for More Than You Think.***

FYI

YEARLY CHANGE IN
PER CAPITA PERSONAL INCOME



1988-
1989

1987-
1988

1986-
1987

Feature Articles



Wyoming's Citizen Legislators in Retrospect

(The following article appears as the Introduction to the 1990 Centennial Session Laws available from the Wyoming Legislative Service Office).

To celebrate Wyoming's Centennial, the State's 50th Legislature is publishing the Session Laws of 1990 in a unique format. As usual the lawmakers have done their level best to satisfy the pressing needs of their constituents. So comprehensive are the new laws that the reader can get a surprisingly good picture of what the State's current problems and aspirations are. The handsome volume should become a collectors' item.

Looking back over Wyoming's legislative history, some sessions stand out, one of them being the first territorial assembly in 1869. There were only nine members in the upper house and twelve in the lower, not counting one House member who never turned up. All were Democrats while the Governor and Secretary, who were appointed by President U.S. Grant, were Republicans.

Fifteen of the legislators in 1869 came from towns along the Union Pacific railway and six from South Pass mining camps. They met in two rented rooms on 16th and 17th Streets in downtown Cheyenne. Fourteen whose occupations could be determined were three lawyers, three saloonkeepers, two bankers, a liquor wholesaler, a jeweler, a druggist, a blacksmith, a livery stable keeper, and a "business man." Only one had been a legislator before (in Nebraska). Very helpful

was the Secretary of the Territory, who had served in the Connecticut legislature.

The most famous law ever enacted by a Wyoming legislature came out of that first session: "An act to grant to the women of Wyoming Territory the right of suffrage, and to hold office." Generally, the other laws were run-of-the-mill for that era. Apparently most of them were copied from the State of Nebraska and Colorado Territory. The legislators did not hesitate to disregard the Governor's recommendations and over-rode several of his vetoes.

In the 1886 session, Governor Francis E. Warren (R), dynamic pioneer resident of Cheyenne, with extensive experience in government and business, orchestrated activity. He had Republican majorities in both Houses. Only three legislators had previous experience. At the end of the session, a Cheyenne editor commented that the legislators "like the wooden performers of a play...have danced to the music from the executive office."

The accomplishments of the session were remarkable, despite Governor Warren's description of the 36 lawmakers (in a private letter) as "a heterogeneous mob of discordant spirits." Guided by Warren, they chose locations for the major institutions. They began taxing railroad land grants, authorized a mill levy for free county libraries, and adopted a comprehensive water law based on the principle of prior appropriation. They asked Congress for more pay, explaining that

\$4 per day and 15 cents a mile for travel (total compensation) did not permit "men of limited means" to participate.

The first state session met November 12, 1890-January 10, 1891, only eight months after the last territorial session. Only seven of the 49 members had previous experience. They enjoyed amenities such as better pay, a one-horse street car that carried them from the Interocean Hotel to the Capitol, and more space than they needed. Wings had been added in early 1890 to the central part of the Capitol which had been built in 1888.

In those days the two Houses in joint session had the responsibility of electing U.S. Senators. With little difficulty the Republican-controlled legislature elected Joseph M. Carey and Francis E. Warren. The latter had been elected Governor, but he immediately entered the Senate race. These two much-admired Cheyenne pioneers were given credit for winning statehood. Carey had served three terms as Wyoming Territory's Delegate to Congress, and Warren, two terms as the Territory's appointed Governor. The first Senators from new states drew lots to see who got two, four or six year terms. Carey drew four years, Warren, two years.

Not many legislators, or citizens in general, were pleased by Governor-elect Warren's departure for Washington, leaving Secretary of State Amos Barber, a weak substitute, as Acting Governor for the next two years. We'll look closely at the First Session at the end of this Introduction, when we compare it with the Fiftieth Session.

In 1893 when the 2nd session convened, the Statehood euphoria had evaporated, partly because the economic development promised by Carey and Warren had not come. For several other reasons as

well, in-state and national, GOP dominance had waned. The Legislature included 23 Republicans, 21 Democrats, and five Populists to work with Governor John E. Osborne (D), who had been elected on a fusion ticket (Democrats and Populists). Much time was spent in quarrelsome joint sessions, trying unsuccessfully to elect someone to follow Senator Warren, whose two-year term had run out. Personal animosities in all three parties and sectionalism prevented block voting. Most reprehensible conduct was that of a Senator who was censured for slipping a Mickey Finn to another Senator, sending him to bed for a few days. So the State had only one U.S. Senator (Carey) during the next two years. With so much time wasted, only 33 laws were adopted, plus a few resolutions and memorials. It was the most unproductive of the regular sessions in the State's first century.

Again the need to elect a U.S. Senator disrupted the 1913 session. J. M. Carey had been ousted in 1895 by F. E. Warren, the better politician, in a bitter but one-sided contest. Ignored thereafter by the "Warren Machine," Carey became first an independent Republican and thereafter a Progressive Republican, supporting Theodore Roosevelt against regular Republican William Howard Taft and Woodrow Wilson (D). Meanwhile the Democrats, who could find no promising candidate in their own party, invited Carey to run for Governor on their ticket in 1910, which he did successfully. After battling the regular Republicans with some success in the 1911 Legislature, he got an opportunity to retaliate for past slights by Warren. Legislators were still electing U.S. Senators, and Warren was seeking a fifth term in 1913. Carey gave behind-the-scenes support to Warren's opponent, John B. Kendrick (D). The 1912 elections gave the Republicans enough legislators to control

joint sessions, with a few to spare. Warren's re-election seemed assured until two freshman Republicans defected and gave the Democrats control of the House. One of the, Martin Luther Pratt, exacted a high price--the speakership in the House. The other turncoat asked nothing, but Warren checked his background in West Virginia. Soon a sheriff came to Wyoming with an arrest warrant based on a 10-year-old forgery charge. Governor Carey refused extradition. Needing more votes to offset Republican Senators and control joint sessions, the Democrats planned to challenge and replace several Republicans in the House.

Then Warren arrived from Washington to rally his troops. After several tumultuous days Speaker Pratt returned to the Republican fold, and Warren won. Pratt retained his position as Speaker, although once he had to yank the Speaker pro tem from the chair. Most people believed that Pratt also received a bribe. In the WYOMING BLUE BOOK there are two group pictures for the 1913 House because the Democrats refused to let their pictures be shown with one of Pratt. Meanwhile the unscrupulous activities of Carey, Kendrick, Pratt, and Warren make modern politicians look like neophytes. Cheyenne editor John Charles Thompson, Jr. called the 1913 session "the most disorderly in Wyoming history." For most of the legislators, the session's only redeeming plus was the opportunity to relax in the luxurious downtown headquarters in the new Plains Hotel. Later in 1913 the ratification of the 17th Amendment to the U.S. Constitution provided for popular election of U.S. Senators. The Great Depression of the 1930s made the session of 1933 the most agonizing of all. Although Republicans controlled the Senate and Democrats, the House, partisanship was subdued. There was no realistic alternative to

joining Governor Leslie A. Miller (D) in cutting expenditures by 30 percent. Appropriations for the next biennium totaled \$3,550,000, including supplements by a special session later in the year.

Before adjournment the 1933 Legislature agreed to go into a special session later in the year, to consider money-saving recommendations by Griffenhagen and Associates. The Chicago experts offered for consideration such changes as these: reducing the number of counties from 23 to 12 or 6, adopting a one-house legislature with only nine to twelve members, elected from the State at large, installing a state administrator appointed by the legislature, letting the Governor preside over the legislature and perform certain other tasks, consolidating 399 school districts, and forming one state police force from several law-enforcement agencies. All suggestions were rejected.

The 19-day special session dealt with a plateful of other business, much of it related to President Franklin D. Roosevelt's recent "100 Days" of New Deal legislation. When the special session adjourned, it had approved 61 laws and eight resolutions and memorials.

Two other sessions stand out for their landmark revenue measures--the 1935 session for its two percent sales tax, and the 1969 session for its one percent minerals severance tax. To conservatives they opened Pandora's box, to others they kept the State alive.

Most Wyoming citizens are proud of their "people's legislature," made up of men and women who could not, or would not, be there if they had to leave their jobs as long as legislators must in most states. Wyoming is one of the few states with such short sessions (40 days in odd-numbered years and 20 days

in even-numbered years). True, the Wyoming legislators are not the amateurs they once were. Compensation has gone up to \$75 per day salary, \$60 per diem expenses, and 35 cents per mile travel, enough to attract plenty of well-qualified candidates who will stay as long as voters will support them. Modern sessions have many veterans. In the first State session only 13 percent had served previously in the Territory. Contrast that situation with the one in 1989 and 1990, when the percentages of repeaters were 85 percent in 1989 and 96 percent in 1990.

Beginning in 1949, special joint interim committees have become increasingly important. In 1990, for example, the joint appropriations committee met in Cheyenne for five weeks immediately before the 20-day session. Also, national and regional organizations of legislators have expanded their programs, reducing state isolation. In 1971 the Legislative Service Office (LSO), with a management council of legislators, was established to supply many services, for example, drafting bills. Formerly the legislators hired lawyers, drafted their own bills, or left that work to lobbyists. The LSO does research for members and studies the performance of executive branch agencies.

A major change occurred in 1974 when the 20-day budget sessions began in even-numbered years, in addition to the 40-day general sessions which had been meeting since Statehood. There is a problem here. Non-budget bills crowd the calendar, notwithstanding the two-thirds vote required for introduction of other than budget bills, and jawboning by the leadership. Critics suggest more discipline or longer sessions.

Almost all modern legislators are middle class (very few blue-collar workers), with a majority coming from business or

professions. The 1990 session had 27 business people and 14 lawyers (several more lawyers than usual). Ranchers have always been prominent except in 1869, but their power has declined somewhat after the urban growth which followed World War Two. In 1990 there were 17 ranchers and 3 farmers. The rural legislators have more influence than their numbers suggest because they are all in the majority (Republican) party, keep getting re-elected, and rise to leadership positions, especially chairmanships of committees that deal with matters of great concern to them. There were few educators before 1970, but 10 appeared in 1971, 19 in 1983, and 14 in 1990. The first woman, Mrs. Mary G. Bellamy, appeared in 1911, first in Wyoming, but not in the nation, as many people think. Two women learned how not to behave in the infamous session of 1913. Women increased slowly to seven in 1977 and to a peak of 24 in 1985 (two in the Senate and 22 in the House). The numbers declined to 4 and 15 in 1990.

Placing the laws of 1890 and 1990 side by side, we see substantial differences. In 1890 the legislators had unique responsibilities, (1) to implement the 1889 Constitution, and (2) to adopt, so far as they were appropriate, the Territorial Laws. After dealing with those tasks, they turned to problems that still concern us--water, public lands, and coal mining. In contrast, many new administrative, fiscal, social, education, and environment problems competed for attention in 1990.

One 1890 law evokes nostalgia: "No one shall drive or ride over a county bridge faster than a walk." Also, a message to Congress asked for "Disarmament of the Indians...within and on the borders of Wyoming...(who) leave the reservations on pretense of hunting...(and) kill cattle of

settlers and menace them and their families." Surrounded by ICBMs and military personnel, members of the 1990 session no doubt thought about disarmament too, but they said nothing to Congress about it as a body.

Republican legislators outnumbered Democrats, 39-10, in 1890, and 60-34 in 1990. Indeed, this they have done always since Statehood except in 1933, 1935 and 1937, the heyday of Franklin D. Roosevelt with his New Deal. The gap between the two parties has usually been less wide after the New Deal than before.

The 1890 session enacted 116 laws and 15 resolutions and memorials. When it sent both Carey and Warren to the U.S. Senate, and set the stage for the Carey-Warren feud, it probably affected future politics more than anything the 1990 session did.

At the end of our first century as a State, we have twice as many legislators as in 1890 with much more experience, the Legislative Service Office, more coherence and continuity, a multitude of watchful constituents and lobbyists, and a sizable media corps.

It should not be surprising that in our much more complex world, the legislature's

50th general session in 1989 passed three times as many laws as did the 1st session in 1890, and the budget session of 1990 added 126 more laws and resolutions. On the other hand, many readers may be shocked to learn that General Fund appropriations increased from only \$402,000 in 1890 and \$4,213,000 in 1939 to \$785,000,000 in 1990. considering inflation, however, the escalation is not unreasonable. The cost of living was less than 100 percent higher in 1939 than in 1890, while it soared 1200 percent or more between 1939 and 1990. The appropriations of 1990 in 1939 dollars amount to no more than \$65,000,000, which is not out of line with those of 1890 and 1939. In fact, all Wyoming legislatures, except a few in the early 1980s, have been hard-pressed for revenue, and the few exceptional legislatures prudently squirreled away one billion dollars in the Permanent Minerals Trust Fund.

It is too early to be categorical about the 1990 session, but tentatively it appears that for the quality of its work, as well as for its quantity, the most experienced legislature in Wyoming history deserves praise in this Centennial Year.

T. A. Larson
Professor Emeritus of History
University of Wyoming

Economic Development Update

Summary

After a halting start five years ago, the Wyoming Economic Development program is showing progress on all fronts. The revision of earlier programs is completed and the successes are becoming more obvious and frequent.

History

Several years ago, after it was determined that the energy and minerals slowdown was going to continue, the leadership of the State enacted a reorganization plan which changed the mission and character of the Department of Economic Planning and Development to the Economic Development and Stabilization Board. Additionally, the Legislature referred a ballot initiative to the citizens of the State for the establishment of a loan program, Amendment IV, which would use State revenues as its source of funds. The early years of the new development agency and the loan program were a time when a good deal of experimentation was carried out. Wyoming never had the need to do much economic development since most of the State's economy was long established, such as agriculture, or was the result of geo/political occurrences over which Wyoming had no control, such as energy resources and minerals. Because of the lack of experience, economic development programs were tried and abandoned and new programs started. The loan program was begun almost immediately following voter approval and a

number of large, high risk loans were made to meet the expectations of the voters and the Legislature.

After a period, the high risk start-up loans began to fail and new expectations about the program began to develop. In short, legislative leaders did not want to see the program involved in high risk ventures and asked the administration to develop more prudent guidelines for the program.

Present

After the shocks of the early years, the Economic Development and Stabilization Board approved a development plan in December of 1988. That plan, and a subsequent update, approved September of 1989, form the basis for the programs currently underway.

A marketing program, designed to acquaint business interests from out of the State with the advantages of a Wyoming location, has generated a number of interests which are beginning to translate to new businesses and jobs.

In-state efforts directed at providing marketing opportunities to existing businesses have also produced some impressive results. Community assessments are underway which provide information to local leaders as to how the business environment and the local development programs can be improved.

The Economic Development and Stabilization Board has also established a customized training program which can be used by businesses to help with the training of Wyoming citizens for newly created jobs.

Programs which act as incentives to promote businesses within the State to expand have also been developed. Grant and loan programs which provide assistance for infrastructure extension, relocation expenses and other business and community improvements are now available.

Businesses can also get advice with marketing and management concerns through the utilization of private firms, on contract to the Economic Development and Stabilization Board.

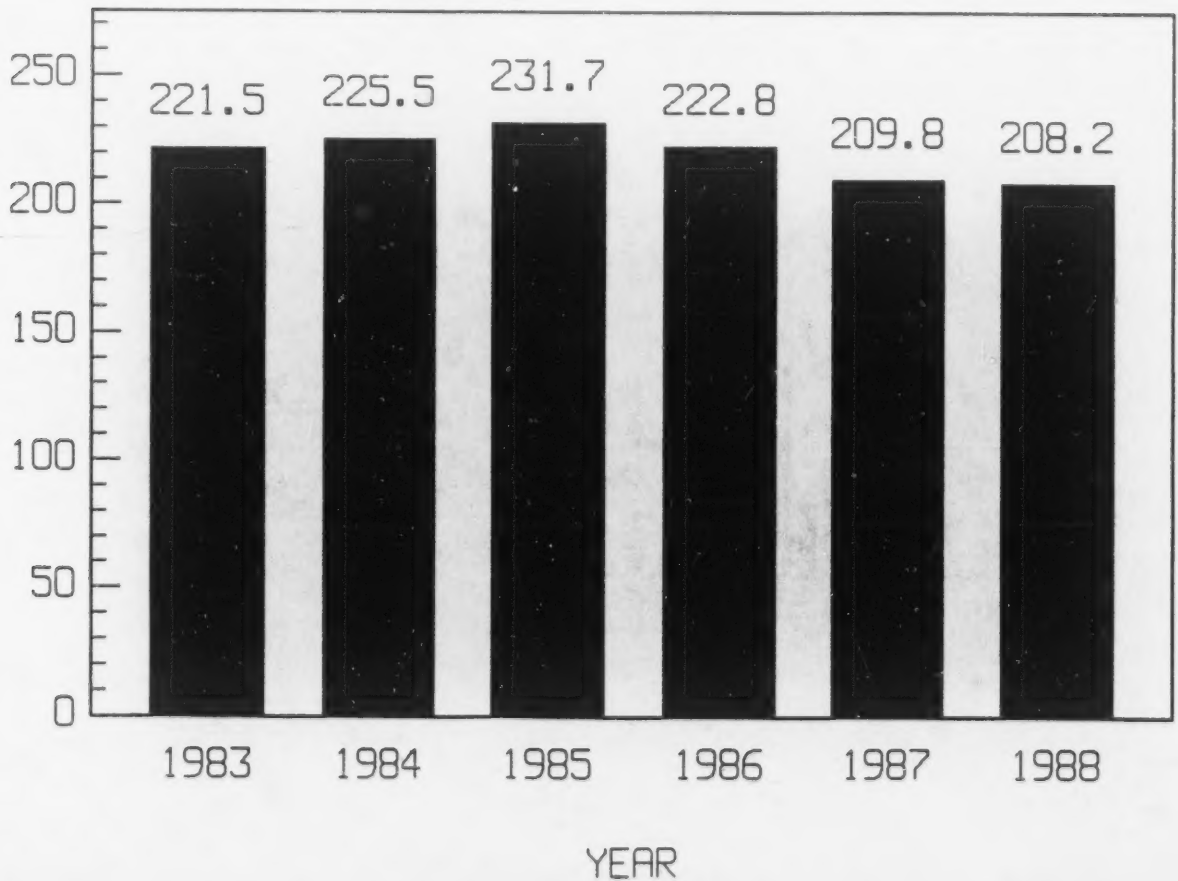
The Future

All of the programs developed over the last couple of years are directed toward assisting private individuals in diversifying the Wyoming economy. As more new and expanding companies begin the process of growth, that diversity will become more apparent. The need for diversity is irrefutable, that the mission has begun on a firm foundation is equally irrefutable, but it continues to require hard work on the part of communities, businesses and their supporting development agencies.

Steven Schmitz
Director
Economic Development and
Stabilization Board

Economic Changes

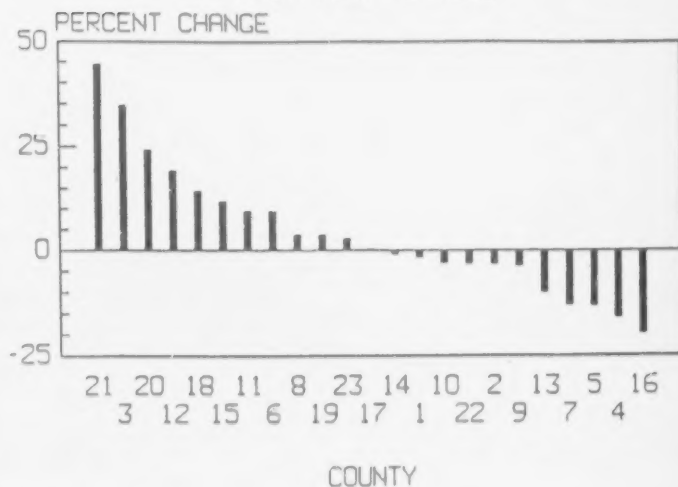
UINTA COUNTY PERSONAL INCOME
MILLIONS OF DOLLARS



ECONOMIC CHANGES

Though not specifically an economic trend, changes in Wyoming's population can have an effect on the general economic character of various counties in the state. As shown in the first graph, 12 counties registered a positive trend in population while 11 counties showed a decline. It is interesting to speculate whether or not these population trends will continue. The second graph depicts population estimates for 1989 provided by the Wyoming State Data Center. Comparing the 1989 estimates with 1988 figures, 8 of the 12 counties with a positive change in population from 1980 - 1988 show a decline in 1989. Conversely, of the 11 counties with negative trends, 8 show a gain in 1989. It will be interesting to see where this population pendulum will swing next.

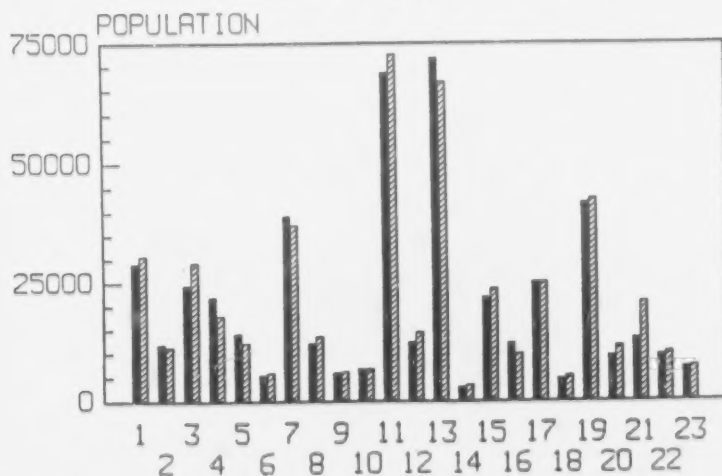
PERCENT CHANGE IN POPULATION BY COUNTY
FROM 1980 TO 1988



KEY

- 1 - Albany County
- 2 - Big Horn County
- 3 - Campbell County
- 4 - Carbon County
- 5 - Converse County
- 6 - Crook County
- 7 - Fremont County
- 8 - Goshen County
- 9 - Hot Springs County
- 10 - Johnson County
- 11 - Laramie County
- 12 - Lincoln County
- 13 - Natrona County
- 14 - Niobrara County
- 15 - Park County
- 16 - Platte County
- 17 - Sheridan County
- 18 - Sublette County
- 19 - Sweetwater County
- 20 - Teton County
- 21 - Uinta County
- 22 - Washakie County
- 23 - Weston County

CHANGES IN WYOMING POPULATION



Graph B
1989
 Graph A
1980

WYOMING COUNTIES
(IN ALPHABETICAL ORDER)

State Data

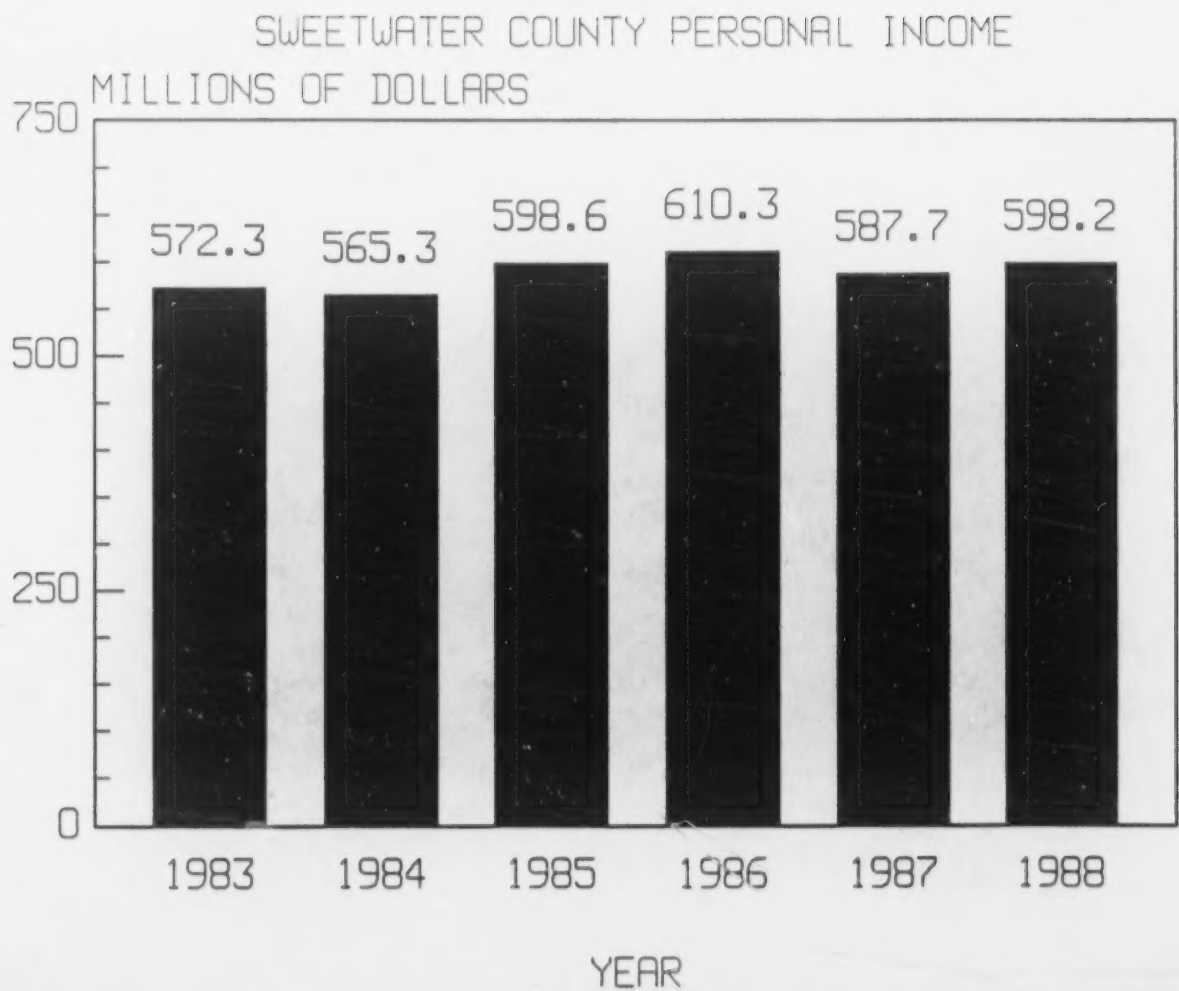


Table 1: Agriculture¹

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Timber Cut in Wyoming National Forests (MBF)	25572.	20299.	75482.	28080.	5860.	39416.	54863.	23488.	6218.	37522.	46222.	26418.
Price Indices ² (1967=100)												
2. Wyoming Crops, Prices Received-Latest	209.	229.	218.	218.	244.	323.	322.	346.	336.	307.	323.	337.
3. Wyoming Crops, Prices Received-Average	207.	230.	218.	217.	234.	302.	323.	344.	335.	327.	317.	327.
4. U.S. Crops, Prices Received-Latest	210.	266.	216.	212.	249.	260.	262.	266.	263.	244.	241.	258.
5. U.S. Crops, Prices Received-Average	203.	223.	217.	214.	230.	262.	260.	264.	269.	250.	245.	263.
6. Wyoming, All Commodities, Prices Received-Latest	263.	304.	268.	301.	260.	313.	292.	324.	297.	308.	297.	322.
7. Wyoming, All Commodities, Prices Received-Average	268.	283.	273.	294.	280.	295.	300.	311.	305.	300.	304.	314.
8. U.S. All Commodities, Prices Received-Latest	237.	235.	232.	237.	253.	264.	265.	274.	267.	261.	270.	281.
9. U.S., All Commodities, Prices Received-Average	233.	234.	235.	238.	246.	263.	263.	275.	250.	264.	267.	278.
10. Wyoming Livestock, Prices Received-Latest	280.	327.	283.	325.	265.	310.	283.	316.	286.	308.	290.	318.
11. Wyoming Livestock, Prices Received-Average	286.	300.	289.	317.	294.	293.	293.	309.	296.	292.	300.	315.
12. U.S. Livestock, Prices Received-Latest	261.	201.	248.	260.	257.	268.	269.	281.	272.	276.	296.	302.
13. U.S. Livestock, Prices Received-Average	242.	241.	252.	259.	259.	264.	267.	284.	273.	276.	287.	293.
14. Prices Paid by U.S. Farmers-Average	331.	336.	335.	339.	348.	352.	354.	359.	361.	361.	365.	281.

¹First time readers of WQU should refer to the "Format" page (in back) for an explanation of abbreviations and table formats.

²The index for the last month (latest) of each quarter, along with the average of the three monthly indices of each quarter.

Sources: Series 1: United States Forest Service. "Timber Cut and Sold, Convertible Products." Region 2 and 4 reports published quarterly.
Series 2-15: Wyoming Crop and Livestock Reporting Service. Bi-weekly Ag Statistics.

Table 2: Banking and Finance

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Total Bank Loans and Leases Financing Receivables (TS)	1931400.	1779168.	1765203.	1733754.	1787542.	1777474.	1758410.	1740029.	1793438.	1787592.	1782338.	1848557.
2. Total Bank Deposits (TS)	3740737.	3688191.	3792473.	3671572.	3705311.	3712403.	3753325.	3623495.	3621158.	3633097.	3838374.	3768344.
3. Total Non-Interest- Bearing Deposits (TS)	591011.	582741.	603809.	531243.	564608.	572367.	577610.	525702.	549281.	559276.	648397.	542168.
4. Savings and Loan Mortgage Loans (TS) ¹	812614.	794162.	772721.	744492.	740954.	726300.	711602.	719240.	696415.	617166.	636718.	INA
5. Savings and Loan Deposits (TS)	1104107.	1104332.	1137196.	1119558.	1107268.	1107961.	1070072.	1032814.	988180.	952120.	962666.	INA
6. Prime Interest Rate ²	8.25	8.70	8.75	8.50	9.00	10.00	10.50	11.50	11.07	10.50	10.50	10.0

¹Only members of the Federal Home Loan Bank Board are included. Indicates amount at the end of the quarter.
²Prime rate charged by banks on short-term business loans. Rate is for last month of the quarter.

Sources: Series 1-3: Office of the State Examiner of Wyoming, Abstract Report of State and National Banks in Wyoming, Published Quarterly.
 Series 4 and 5: Federal Home Loan Bank of Seattle, Monthly Report. Comparative statistical analysis of member institutions.
 Series 6: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 3: Business Conditions

<u>Calendar Quarters</u>	<u>2/87</u>	<u>3/87</u>	<u>4/87</u>	<u>1/88</u>	<u>2/88</u>	<u>3/88</u>	<u>4/88</u>	<u>1/89</u>	<u>2/89</u>	<u>3/89</u>	<u>4/89</u>	<u>1/90</u>
1. New Domestic Corporations	270.	267.	254.	300.	298.	246.	221.	274.	302.	236.	276.	219.
2. New Foreign Corporations	232.	259.	229.	208.	196.	208.	232.	210.	249.	196.	208.	118.
3. Total New Corporations	502.	526.	483.	508.	494.	454.	453.	484.	551.	432.	484.	337.
4. Business Failures	72.	56.	53.	75.	52.	34.	32.	31.	30.	24.	25.	31.
5. Value of Business Failures (\$)	5896578.	5918282.	14181020.	11499022.	3906790.	28339514.	36551338.	3120102.	7852143.	3591064.	1998791.	2914000.
6. Personal Bankruptcies	359.	301.	308.	271.	351.	306.	306.	274.	336.	287.	285.	237.

Sources: Series 1-3: Secretary of State. New and Foreign Corporations. Monthly report.
 Series 4-6: Cheyenne Credit Bureau. Wyoming bankruptcy cases, business failures, and value of failures. Weekly publication.

Table 4: Construction

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. New Residential Dwelling Units	458.	744.	297.	304.	449.	359.	291.	233.	294.	401.	264.	394.
2. Value of Residential Dwellings Constructed (M\$)	34.2	59.4	34.3	23.5	37.3	31.3	22.6	18.2	25.1	34.7	23.8	34.7
3. Value of Nonresidential Construction (M\$)	39.7	23.0	18.2	4.2	35.2	6.9	10.2	10.9	16.1	23.3	20.7	15.5
4. Building Permits Issued in Selected Wyoming Cities	2841.	3953.	2451.	1489.	2763.	2220.	2082.	1578.	2806.	2663.	1996.	1695.
5. Value of Authorized Construction (T\$)	23444.	24258.	13633.	15559.	25330.	21878.	18071.	8866.	24528.	22760.	27343.	16011.
6. Mortgage Interest Rate ¹	9.05	9.03	8.78	8.77	8.72	8.90	9.03	9.66	10.09	9.87	9.70	9.70

¹Conventional first mortgage for new home purchase. U. S. average for last month of quarter.

Sources: Series 1-3: F.W. Dodge Division of McGraw-Hill. "Dodge Local Construction Potentials." Published monthly.

Series 4-5: Survey Research Center. "Local Construction Reports." Survey of authorized construction in selected cities conducted monthly.

Series 6: U. S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 5: Consumers

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. New Truck Registrations	3155.	3011.	3391.	2867.	3508.	3203.	3227.	3086.	3734.	3775.	3344.	3474.
2. New Car Registrations	3171.	3332.	3027.	2736.	3147.	2969.	2849.	2538.	3341.	3412.	2409.	2352.
3. Wyoming Personal Income (M\$)	6336.	6286.	6409.	6409.	6617.	6537.	6587.	6592.	6666.	6688.	6882.	IMA
4. U.S. Disposable Income (B\$)	3147.	3225.	3316.	3376.	3422.	3512.	3587.	3690.	3748.	3807.	3876.	3961.
5. U.S. Personal Income (M\$)	3717996.	3777771.	3904535.	3940516.	4022113.	4083999.	4166501.	4258945.	4331901.	4381863.	4470967.	IMA
6. Latest U.S. Consumer Price Index (1982-1984=100) ¹	112.4	113.8	114.2	115.1	116.7	118.5	119.2	120.8	122.8	123.6	124.6	127.1
7. Quarter's Average U.S. CPI	112.0	113.3	114.2	114.8	116.7	117.8	119.5	120.2	122.4	123.3	124.4	127.5
8. Liquor Sales (TS)	6673.	7616.	8379.	5679.	6714.	7041.	8368.	5530.	6747.	7269.	7746.	5729.

¹ Number shown is for the last month of the quarter. CPI shown is the index for wage earners and clerical workers.

² Beginning January 1987, the consumer price index, previously expressed on a base of 1967=100, has been rebased to 1982-84=100. Selection of the 1982-84 period was made to coincide with the updated expenditure weights, which are based upon data tabulated from the Consumer Expenditure Surveys for 1982, 1983, and 1984. Historical data on the new base or additional information regarding these changes is available from the Bureau of Labor Statistics, Washington, D.C. 20212.

Sources:

Series 1-2: R.L. Polk and Company Motor Statistical Division. "National New Vehicle Registration Service." Published monthly.
 Series 3,4: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published quarterly.
 Series 5,6,7: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.
 Series 8: Wyoming Liquor Commission. Sales data are reported to SRC.

Table 6: Employment and Labor¹

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Civilian Labor Force	248444.	242054.	230684.	228734.	232589.	235250.	231426.	235106.	225615.	225475.	224793.	234724.
2. Employment	226738.	225635.	214312.	209923.	219454.	222072.	216552.	217688.	212474.	212137.	212196.	223852.
3. Unemployment	21707.	16419.	16371.	18811.	13135.	13178.	14874.	17418.	13141.	13338.	12597.	10871.
4. Unemployment Rate	8.7	6.8	7.1	8.2	5.6	5.6	6.4	7.4	5.8	5.9	5.6	4.6
5. Initial Claims Filled	8086.	6386.	9983.	10949.	6888.	5376.	9704.	10334.	6508.	4773.	8659.	9220.
6. Miners' Average Weekly Hours	40.8	42.7	45.4	42.9	43.6	43.4	42.7	46.3	42.7	43.6	44.0	43.8
7. Miners' Average Weekly Pay (\$)	602.91	605.87	637.42	625.72	533.42	619.70	627.33	678.68	612.15	611.21	617.15	660.70
8. Miners' Average Hourly Wage (\$)	14.79	14.19	14.04	14.60	12.23	14.29	14.68	14.67	14.34	14.01	14.02	15.08

¹The most recent year's data are preliminary.

Sources: Series 1-11: Wyoming Employment Security Commission. Labor Force Trends. Published monthly.

Table 7: Energy and Mineral Production

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Wyoming Coal (TST)	33887.	39261.	38831.	37323.	39016.	42883.	41013.	41874.	40469.	41114.	41629.	45139.
2. U.S. Coal (TST)	219022.	226784.	246314.	231473.	225968.	239046.	227754.	249267.	238251.	236713.	250209.	261688.
3. Wyoming Oil (TBP)	302.	310.	317.	320.	317.	306.	299.	302.	301.	296.	295.	292.
4. U.S. Oil (TBP)	8339.	8227.	8347.	8304.	8216.	8033.	7984.	7753.	7827.	7669.	7607.	7459.
5. Wyoming Natural Gas (MMCFD) ¹	1281.	1171.	1203.	1430.	1339.	1135.	1455.	1953.	1274.	1340.	1191.	INA
6. U.S. Natural Gas (MMCFD)	45830.	44335.	49241.	50768.	46453.	44547.	48982.	48936.	46397.	44527.	47876.	INA
7. Active Rig Counts in Wyoming-Average	27.	47.	61.	40.	33.	43.	31.	20.	22.	43.	50.	34.

¹Beginning with fourth quarter 1986, Wyoming Gas includes carbon dioxide production.

Sources: Series 1,2,5, and 6: U. S. Department of Energy. Energy Data Reports. Gas data are from Natural Gas Monthly, and the Wyoming Oil & Gas Conservation Commission. Coal data are published weekly.
 Series 3-4: The Oil and Gas Journal. U.S. and Wyoming Oil Production. Published weekly.
 Series 7: Petroleum Information Corporation, Hughes Tool Company. Monthly Average Active Rig Counts in Wyoming.

Table 8: Government

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Sales and Use Tax Collections (TS)	39591.	44922.	47115.	42585.	42769.	49721.	46445.	41823.	42966.	53145.	54618.	51699.
2. Violent Crime ¹	325.	435.	354.	354.	371.	431.	308.	310.	278.	323.	307.	INA
3. Nonviolent Crime ²	4772.	5057.	4420.	3713.	4562.	4662.	3917.	3565.	4423.	4704.	4138.	INA
4. Stolen Property (TS)	2342.	2494.	2199.	1770.	1986.	2467.	2272.	2040.	2617.	2200.	1894.	INA
5. Stolen Property Recovery Rate	35.7	33.1	34.1	42.2	43.1	35.5	36.0	42.8	30.5	44.0	36.7	INA
6. Percent of Crimes Cleared ³	26.6	44.2	34.5	33.7	28.3	30.9	40.0	33.0	27.5	27.1	29.5	INA

¹ Murder, negligent homicide, forcible rape, robbery, aggravated assault.

² Burglary, larceny, auto theft.

³ Clearance of a crime indicates resolution of a complaint by arrest or other extraordinary means.

Sources: Series 1: Wyoming Department of Revenue and Taxation, Sales and Use Tax Division. "Net Collections by Business Class by County." Published monthly.

Series 2-6: Uniform Crime Reporting Center for Criminal Justice Research, Division of Criminal Identification, Office of the State Attorney General. "Crime in Wyoming." Published quarterly.

Table 9: Tourism

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
-------------------	------	------	------	------	------	------	------	------	------	------	------	------

Visitors, National Parks and Monuments

1. Yellowstone	681163.	1692818.	168613.	83736.	649842.	1268270.	216076.	82542.	720021.	1724290.	153523.	79552.
2. Grand Teton	535659.	1486479.	264932.	144982.	624400.	1083754.	223562.	211180.	665734.	1361210.	302539.	170799.
3. Devil's Tower	92700.	215299.	17980.	7121.	109993.	222877.	20702.	8064.	120589.	229668.	19106.	8251.
4. Fossil Butte	5082.	13793.	1072.	286.	5894.	13838.	1195.	224.	5565.	13192.	1452.	195.
5. Fort Laramie	35117.	50167.	4437.	1172.	24384.	49631.	4145.	1475.	20488.	40697.	3007.	1505.
6. Big Horn NMA-South ¹	55064.	70305.	40782.	30045.	60727.	58820.	35558.	14293.	47417.	62160.	185172.	15664.

Other Tourism Indicators

7. Traffic Count (Avg. number of Vehicles/Day)	116920.	163546.	113385.	88529.	142830.	178675.	118023.	113409.	146663.	184209.	118130.	105793.
8. Hotel, Motel, and Camp Sales Tax (T\$)	891.	1821.	1871.	947.	1050.	2106.	1929.	950.	1013.	1962.	1951.	609.
9. Gasoline Sales (TCL)	79620.	98146.	71190.	62295.	81811.	96106.	70784.	61807.	78869.	INA	INA	INA

¹ Big Horn Canyon N.R.A. is only partially in Wyoming. Only visitation for the Wyoming part is shown.

Sources: Series 1-6: Monthly visitor use reports of the National Park Service.

Series 7: Traffic Survey Unit - Planning Branch, Wyoming State Highway Department. "Selected Recording Stations Traffic Counter Data."

Published monthly.

Series 8: Wyoming Department of Revenue and Taxation. "Sales and Use Tax Summary by County by SIC Major and Minor." Reported monthly.

Series 9: Petroleum Association of Wyoming. Monthly Gasoline Gallonage Report.

Table 10: Utilities¹

Calendar Quarters	2/87	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90
1. Residential Electric Connections	176113.	175745.	175879.	175896.	176333.	177122.	176457.	175841.	175589.	175485.	176197.	174439.
2. Residential Electric Consumption (TKWH)	337943.	291941.	399068.	505669.	351036.	301098.	401776.	688891.	348577.	296588.	418463.	488454.
3. Commercial Electric Connections	33744.	33898.	33780.	33602.	33722.	33846.	33756.	33928.	33997.	34038.	140722.	34036.
4. Commercial Electric Consumption (TKWH)	403123.	419465.	416675.	456190.	420630.	425495.	426766.	467697.	414902.	428705.	449339.	457875.
5. Industrial Electric Connections	2791.	2796.	2764.	2760.	2748.	2921.	2872.	2972.	3104.	3143.	3084.	3203.
6. Industrial Electric Consumption (TKWH)	1587866.	1740306.	1819191.	1788103.	1815370.	1720051.	1847617.	1812799.	1923513.	1790624.	1968557.	1990072.
7. Other Connections ²	3201.	3195.	2680.	2965.	3690.	3899.	3404.	3349.	7440.	4573.	4091.	4675.
8. Other Consumption (TKWH)	51328.	84447.	16355.	0451.	24283.	64994.	13221.	9051.	41364.	102572.	59012.	57146.
9. Residential Natural Gas Connections	74384.	73512.	72654.	4286.	73935.	90673.	93300.	100074.	99535.	97665.	90066.	90456.
10. Residential Natural Gas Consumption (MCF)	1944656.	740699.	2274494.	40738.	2042533.	826220.	2521850.	5786697.	2436947.	871763.	2454142.	4537105.
11. Commercial Natural Gas Connections	6617.	6546.	6520.	5643.	6560.	8357.	9398.	9422.	9289.	10514.	18913.	19028.
12. Commercial Natural Gas Consumption (MCF)	939284.	408459.	997247.	19,9461.	957241.	475106.	1349515.	2981071.	1283967.	631348.	1818451.	3305106.
13. Industrial Natural Gas Connections	93.	88.	87.	88.	90.	90.	78.	85.	82.	80.	79.	73.
14. Industrial Natural Gas Consumption (MCF)	601308.	508551.	828532.	3249154.	482088.	2324709.	2504087.	3069267.	1977830.	2279086.	2611580.	3019329.
15. Other Natural Gas Connections	37.	38.	35.	39.	36.	35.	34.	36.	36.	34.	33.	29.
16. Other Natural Gas Consumption (MCF)	1225.	7352.	6988.	12922.	1920.	7488.	232.	1216.	4344.	10405.	312.	138.

¹ Some small utilities do not report, hence the data are slightly less than actual state totals. The data are consistent. The same utilities' reports are included in each figure.

² "Other" includes agriculture, municipal, and other public.

³ Starting with third quarter, 1988, the figures for Residential and Commercial Natural Gas Connections and Residential and Commercial Natural Gas Consumption reflect the merger of Northern Gas Division, Northern Utilities Division, and Northern Mountain Gas Company now doing business as Northern Gas of Wyoming.

FORMAT

For data available at least quarterly, the last 12 quarters are printed in **WQU**. In this edition, published series begin with the 2nd quarter of 1987, and end with the 1st quarter of 1990. For other data series (primarily annual), the most recent observations, up to 12, are published in **WQU**. Quarters are calendar quarters. For example, the 4th quarter is composed of October, November and December. In the table headings and narratives, a particular quarter will be indicated by notation such as 2/87 (2nd quarter, 1987), 3/87 (3rd quarter, 1987), and so on.

Beside each data series name is an abbreviation in parenthesis. The abbreviation indicates the units (such as dollars, tons, feet, miles, etc.) of the data. The key to the units abbreviations is below.

Throughout **WQU**, all data are for the State unless otherwise stated. The most recent year's data should be viewed as preliminary, due to revisions. The acronym "INA" signifies that information is not available.

The reader should be attentive to the footnotes at the bottom of pages, particularly those accompanying a data table. The footnotes help the reader to properly interpret the data, and they also indicate when more detailed (by subject or by area) data than that which is shown is available from SRC. A list of sources follows the footnotes.

Key to Units Abbreviations

MBF	-	Thousand Board feet	CWT	-	Hundred Weight
KWH	-	Kilowatt Hours	ST	-	Short Tons
TKWH	-	Thousand Kilowatt Hours	HST	-	Hundreds of Short Tons
\$	-	Dollars	TST	-	Thousands of Short Tons
H\$	-	Hundreds of Dollars	\$/ST	-	Dollars Per Short Tons
T\$	-	Thousands of Dollars	HBBL	-	Hundreds of Barrels
M\$	-	Millions of Dollars	TBPD	-	Thousands of Barrels Per Day
B\$	-	Billions of Dollars	MCF	-	Thousand of Cubic Feet
GL	-	Gallons	HMCF	-	Hundreds of MCF Per Day
TGL	-	Thousands of Gallons	MMCFD	-	Million Cubic Feet Per Day

Feature Articles

--Wyoming's Citizen Legislators
in Retrospect
T. A. Larson
Professor Emeritus of History

--Economic Development Update
Steve Schmitz
Director
Economic Development and
Stabilization Board

Subscriptions

Subscriptions to the Wyoming Quarterly Update are available for \$12.00 per year or \$3.00 an issue. Payment should be made to the Survey Research Center and mailed, along with name and address, to the address listed below.

The Survey Research Center

The Survey Research Center was established in the Summer of 1989. In addition to maintaining the data base used to publish the Update, the Center has the facilities, equipment, personnel and expertise to collect, compute and analyze survey data for both the public and private sector. The Center also serves as the Campus Affiliate Center of the State Data Center in Cheyenne and has information from the United States Census Bureau available.

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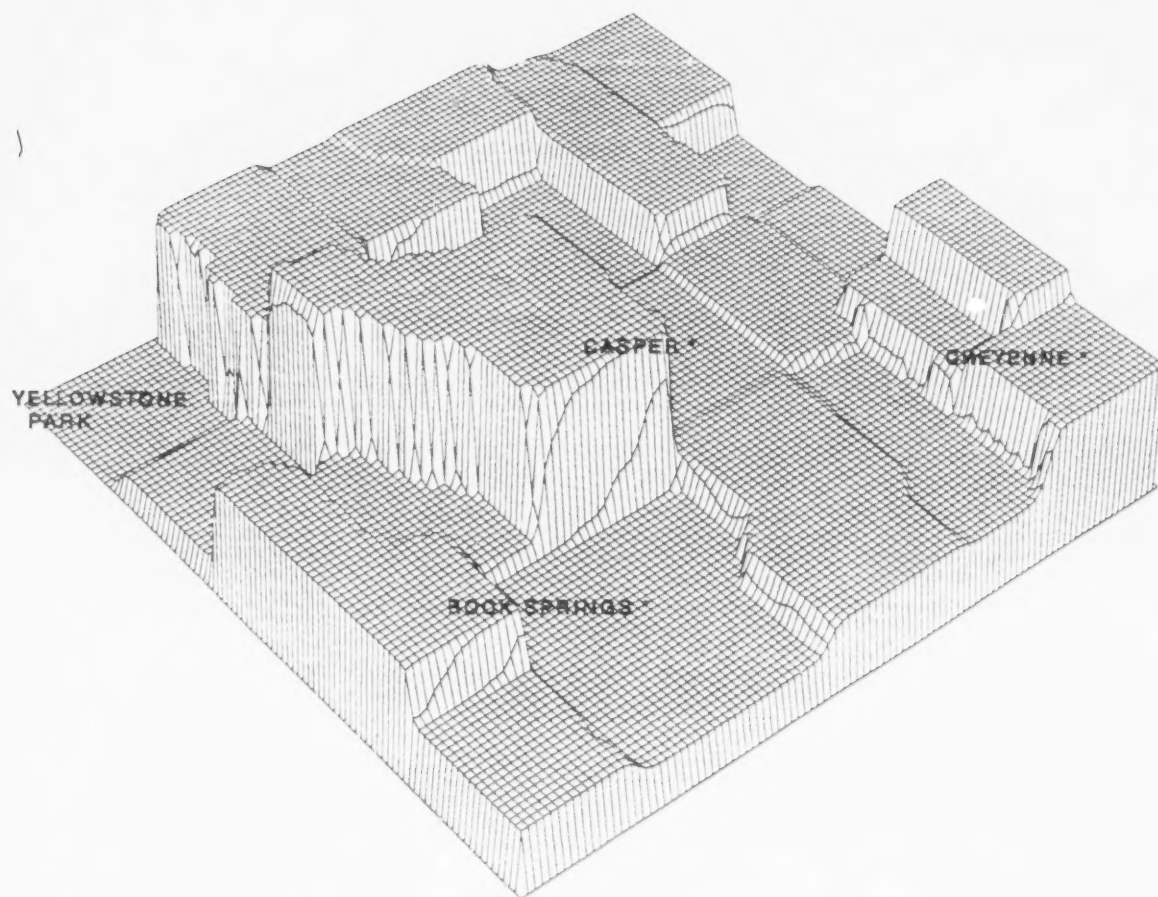
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WYOMING QUARTERLY UPDATE

SUMMER 1990

Vol. 9, No.4

U UNIVERSITY OF
WYOMING



SRC
SURVEY
RESEARCH
CENTER

NUMBER OF FARMS IN WYOMING COUNTIES, 1987

SURVEY RESEARCH CENTER
DEPARTMENT OF POLITICAL SCIENCE
UNIVERSITY OF WYOMING

Wyoming Quarterly Update

Wyoming Quarterly Update (WQU) represents the efforts of the Survey Research Center at the University of Wyoming to provide improved data access services. The data presented in WQU are assembled from secondary sources, such as government agencies and private industry. The staff of SRC greatly appreciates the ongoing, helpful cooperation of each of the data sources.

WQU provides current indicators and timely, easily accessible data. Most of the data published in WQU are updated quarterly with the most current numbers. The complete data sets from which WQU originates are maintained, together with documentation by SRC. Readers are encouraged to contact the Center to find out how to gain access to data which do not appear in the WQU. Many data series, such as gasoline sales and taxation data, span more than 30 years. Numerous other series cover 20 years or more.

The cover of each edition features a contour map illustrating the geographic distribution of a particular variable. This edition presents the number of farms present in each county for the year 1987. Data was obtained from the U.S. Census Bureau's 1987 Census of Agriculture. The Census Bureau defines a farm as any place from which \$1,000.00 or more of agricultural products were produced and sold or normally would have been sold during the census year. (The definition of farms includes ranches). For more information from the 1987 Census of Agriculture see the Economic Changes section and divider pages of this issue.

County	# of Farms	County	# of Farms	County	# of Farms
Albany	287	Hot Springs	158	Sheridan	586
Big Horn	570	Johnson	272	Sublette	253
Campbell	489	Laramie	595	Sweetwater	183
Carbon	320	Lincoln	528	Teton	110
Converse	337	Natrona	304	Uinta	283
Crook	461	Niobrara	282	Washakie	225
Fremont	908	Park	618	Weston	235
Goshen	717	Platte	484	Yellowstone	0

First-time readers of WQU should refer to the "format" explanations on page 64 for keys on how best to use and interpret data presented in this publication.

For additional information, contact:

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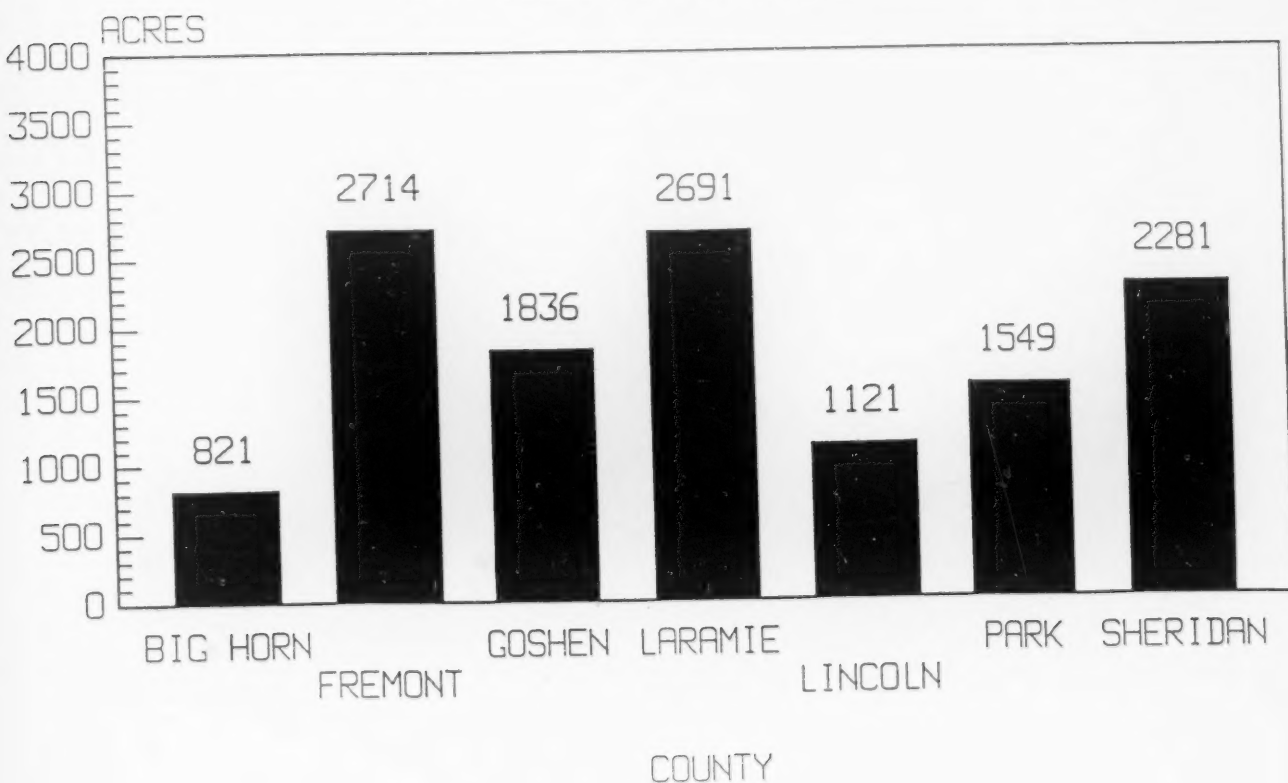
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The articles appearing in this publication represent the opinions of the authors and do not necessarily reflect the views of the State of Wyoming or the University of Wyoming or their respective executive officers. Duplication or quotation of material in this publication is welcomed, but it is requested that **WQU**, the Survey Research Center, University of Wyoming, be credited.

Wyoming Scene

AVERAGE SIZE OF FARMS
FOR SELECT WYOMING COUNTIES



Overview and Perspective

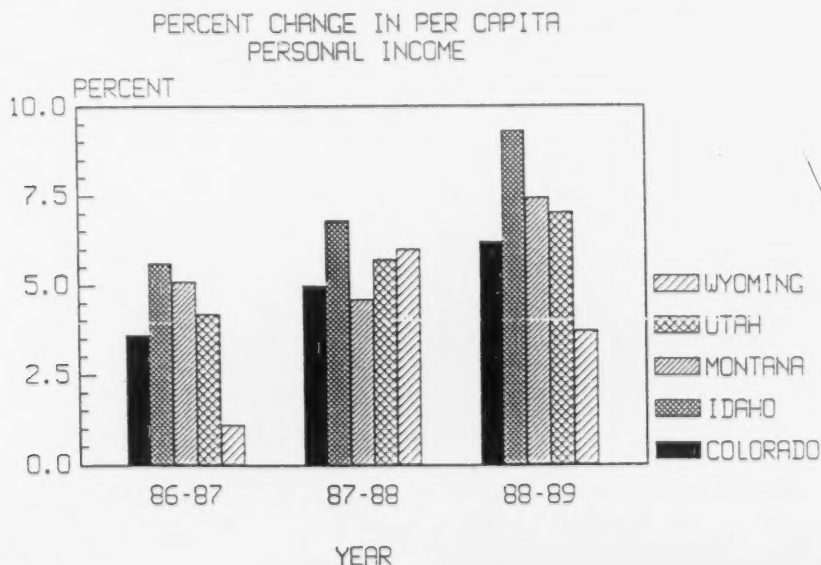
The Bureau of Economic Analysis recently released income data through 1988 for Wyoming counties. Though always 2 years behind, the statistics show what many in Wyoming already knew: As the mining industry goes, so goes Wyoming.

The effects of the mining industry are best seen at the county level. In 1983 there were fourteen Wyoming counties where mining provided the biggest source of personal income of all the private industries. By 1988 only nine counties could say the same. During this same time period Wyoming's per capita personal income (PCPI) only rose by \$1,805 from \$11,836 to \$13,641. The counties with the biggest increase in PCPI from 1983-1988 (Teton, Platte, and Niobrara) did not boast mining as their main private industry. In contrast, in the counties with the smallest increase in PCPI (Campbell, Lincoln, and Carbon) mining was the most productive of the private industries in terms of personal income.

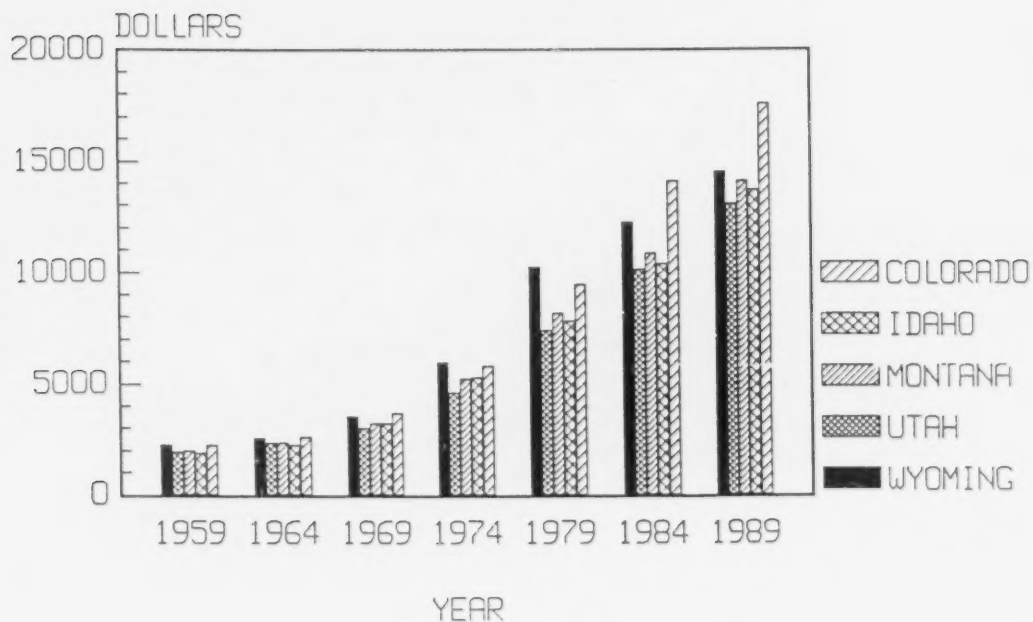
In Wyoming in 1983 the mining industry posted 1,039,526 (in thousands of dollars) in earnings. The closest private

industry was the service industry at 609,324. By 1988 mining earnings had decreased to 777,716 while the service industry's earnings had increased to 769,996, now a much closer second. By 1989 the service industry contributed 845,020 in earnings while the mining industry's earnings were 776,217.

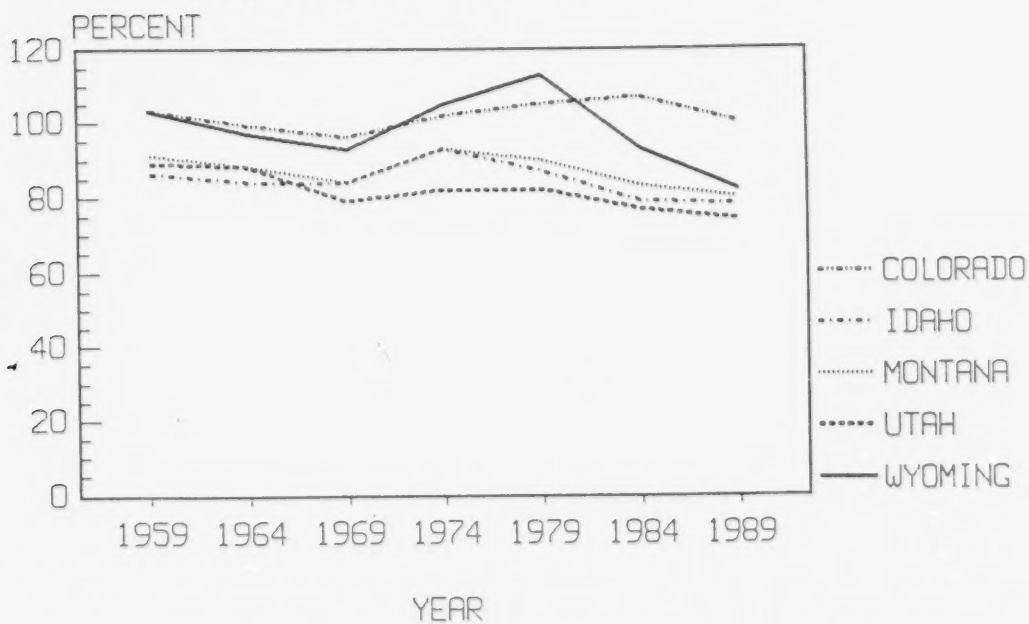
So how does this myriad of figures compare with those for the other Rocky Mountain states (Colorado, Idaho, Montana, and Utah). Earnings in the private industry in all these states was highest among the service industry in both 1983 and 1988, whereas in Wyoming this distinction fell to the mining industry. As mentioned, from 1983 to 1988 Wyoming's PCPI rose \$1,805. This was the lowest increase of all the Rocky Mountain States where increases ranged from \$3,264 in Colorado to \$2,792 in Utah. Wyoming's PCPI of \$13,641 in 1988 was still enough to rank us second behind Colorado, a position also held in 1983. However, in 1988 Montana (who ranked 3rd in PCPI in the Rocky Mountain States) was only \$738 behind Wyoming in PCPI. By 1989 this figure decreased to \$283.



PER CAPITA PERSONAL INCOME



PERSONAL INCOME: PERCENT OF NATIONAL AVERAGE



The tables on these pages help compare Wyoming with its neighbors and the nation as a whole. Information for these tables and the above text was provided by the Bureau of Economic Analysis and is available by calling the Survey Research Center. It should be interesting to see how these figures change in 1990 after the 1990 Census provides more accurate population counts.

Figures for the second quarter of 1990 looked fairly promising. Unemployment was down from a year ago to 5.0 and the number of people employed in Wyoming has steadily increased since fourth quarter 1989.

The Wyoming Department of Employment reported that Campbell county had the highest unemployment rate in April and May with Sweetwater county taking over this spot in June. Albany county had the lowest unemployment rate to begin the 2nd quarter but Teton county ended up on top for May and June. The number of new corporations, both domestic and foreign, rose to 612. This compared to 512 last quarter and 551 a year ago. The number of business failures decreased from last quarter to 28, almost half what it was 2 years ago. However personal bankruptcies are on the rise at 362, up from 237 last quarter and 336 a year ago.

Most of the states tourist attractions showed a gain in visitor totals from a year

ago. The result of this increase is an increase in lodgings sales tax from 2nd quarter of 1989 as well.

Preview of Coming Attractions

- The Green River Tenneco plant is making plans to expand its soda ash production capacity. This should result in 100 additional jobs. The expansion should be completed by the middle of 1992

- Wyoming received \$10.3 million for mine reclamation work in Park, Big Horn, Sheridan, Fremont, and Natrona Counties.

Terry's Trivia

From FY88 to FY89 only one county in Wyoming showed a positive percent change in total purchases of distilled spirits and wines. Teton County had a 6.19% change while all other counties had negative percentages ranging from -14.19% in Crook County to -.34% in Washakie County.

Terry Haven
Editor
Survey Research Center
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Summer Minerals Update

OVERVIEW

The second quarter of 1990 had both its good and its bad points. Let's look at what happened to some of the major commodities. In regard to oil, four new enhanced oil recovery projects were announced at the end of the second quarter (see Oil and Gas Update). Collectively, these tertiary recovery projects announced by Amoco, Exxon, Kerr-McGee, and GLG Energy could account for an additional 64.3 million barrels of recoverable oil. Although this incremental production will be spread over quite a few years, it will help to slow the steady decline in annual oil production forecast for the State. In addition, oil production from a newly drilled horizontal hole in southeastern Wyoming may signal a significant new play in the Niobrara Formation.

Unfortunately, oil prices continued a decline that began in the first quarter, dropping to as low as \$14.75 in mid-June. Early in the third quarter, however, the price had rebounded and was back up to \$17.00 by mid-July.

In regard to natural gas, I must also echo some earlier comments by the Head of our Oil and Gas Division. He noted that it is the gas industry that is poised to give the State's economy a real boost. Wyoming has enough gas reserves to support a large enough increase in gas production to offset value declines related to declining oil production. The proposed Wyoming to California gas pipelines are the beginning of that economic boost. And the increased drilling in the gas fields of southwestern

Wyoming shows that the gas industry is preparing itself.

In the meantime, gas prices have not been faring all that well. The spot sale price at Opal ended the second quarter at \$1.05, compared to a high of \$2.05 in January 1990. Because the higher prices in January were related to some local shortages of gas supplies during a period of high demand, odds are that the price of gas will turn around soon. There was, however, no turnaround in the second quarter of the year.

The 171.1 million tons of coal produced in Wyoming in 1989 was enough for Wyoming to retain its first place among the coal-producing states. Kentucky, however, remained a close second. Because cumulative Wyoming coal production for the first three months of 1990 is already 3.1 million tons more than it was in 1989, it looks like 1990 production will set yet another record.

It has also been pointed out (see Coal Update) that Wyoming coal only ranked fifth in total value in 1989, behind Kentucky, West Virginia, Pennsylvania, and Illinois, respectively. While this is probably correct, it certainly does show the bargain that utilities get when they buy inexpensive, low-sulfur, Wyoming coal. And Wyoming's compliant coal also reduces any costs related to the control of emissions as well. You might say Wyoming's loss in value is simply the consumer's gain.

While the number of reported new coal sales was notable in the second quarter

of 1990 (see Coal Update), the price for a ton of Wyoming coal showed no gains in the first two quarters of the year. Perhaps the most serious thing noted in the second quarter was a short newspaper article that said a strike involving the Burlington Northern Railroad had at least temporarily been averted. A crippling strike involving this particular carrier would affect more than 100 million tons of coal produced in Wyoming as well as most of what is produced in Montana. There have been no follow-up articles regarding a strike.

Turning to trona, production has remained high and 1990 production should meet or exceed the record 18.0 million tons that we have forecast. It is interesting that an earlier somewhat pessimistic forecast by an industry observer has been proven wrong. Soda ash markets have not faltered as that forecaster predicted. What's more, all of Wyoming's soda ash producers have now announced plant expansions.

While it has been hard to find any good news in regard to the uranium industry, it is certainly encouraging that uranium prices increased from \$8.80 per pound to \$11.00 at the start of the third quarter. It is also encouraging that Pathfinder still has ongoing operations in the Shirley Basin, and that there is a good likelihood that the new owners of Malapai's in-situ operation will reopen it in the not too distant future.

Based on our observations through the first two quarters of 1990, we have increased our 1991 to 1993 forecasts for in-situ uranium production to 1.5, 2.5, and 2.5 million tons, respectively. If coal production continues to increase like it has through March, we may be able to increase our 1990 coal forecast of 177.1 million tons by the end of the third quarter.

Gary B. Glass
State Geologist
Geological Survey of Wyoming

OIL AND GAS UPDATE

In January and February 1990, the average posted prices for Wyoming Sweet crude oil were at their highest levels in over three years. Since then (March through June), however, the average posted price has declined. By way of an explanation, refiners across the country bought extra crude oil in January and February to replenish their stocks which had been lowered following the high demand for heating oil and other products during the very cold December of 1989. They were able to rebuild their inventories rather quickly because of the relatively warm weather in early 1990.

OPEC had responded to this increased demand for crude oil in January and February with increased production. Unfortunately, OPEC also continued to produce more crude oil in March and April after most refiners had rebuilt their stocks. Because refiners were no longer willing to pay as much for crude oil once their inventories were rebuilt, prices for crude oil dropped in March and April. OPEC met in early May and agreed to cut production by 1.45 million barrels per day. This agreement stabilized the market somewhat during May. Although several OPEC countries cut back their production in May, several others continued to overproduce. The net effect was a production cut of only 400,000 barrels in May instead of the 1.45-million-barrel cut that was agreed upon.

News of OPEC's overproduction in May sent posted prices for Wyoming Sweet to \$14.75 per barrel in mid-June. Posted prices

recovered later in June when reports indicated that OPEC had cut production more than expected in June and that some non-OPEC countries were also considering possible production cuts. Price increases in late June were tempered somewhat by reports that showed refiners' stocks at 40 million barrels (11.5 percent) above the levels of one year ago.

Third quarter posted prices for Wyoming Sweet crude could average less than \$17 even if OPEC significantly cuts their production. It appears that refiners' inventories are high enough to handle much of the increased demand for products during the summer driving season. If OPEC does not exercise production restraint over the next several months, Wyoming producers may receive even less for their crude oil for the rest of the year.

In response to lower prices, the rig count has stayed relatively low in the second quarter after being somewhat higher than 1989 levels at comparable times during the first part of 1990. Seismic permits and applications for permits to drill (APD's) issued by the Wyoming Oil and Gas Conservation Commission are higher than at the same time in 1989. When projected for all of 1990, however, they are at similar levels to the last four years. It is possible that APD's will end up slightly higher in 1990 than in 1989 because these applications often increase during the latter part of the year.

All or portions of several projects were certified as tertiary recovery operations at a special hearing held by the Wyoming Oil and Gas Conservation Commission in late June. Applications were filed by Amoco, Exxon, Kerr-McGee, and GLG Energy. Amoco plans to use the huff n' puff process (single-well, cyclic, carbon dioxide stimulation)

on as many as 4,000 wells in Elk Basin, Little Buffalo Basin, Winkelman, Lander, Beaver Creek, Lost Soldier, Wertz, and Salt Creek Fields over the next ten years. The project will involve injection of carbon dioxide (CO₂) into multiple producing zones within each field. It will take around 10 million cubic feet of CO₂ for each treatment. Amoco estimates that as much as 23.6 million barrels of incremental oil will be recovered if all the planned wells are injected with CO₂.

Exxon plans to inject 160 billion cubic feet of CO₂ into the Shannon Sandstone at Hartzog Draw Field and estimates that additional oil recovery from this more conventional CO₂ flood will range from 14 to 22 million barrels. The project is due to begin late in 1992. Exxon may supply the CO₂ for this project with a new pipeline from their Shute Creek plant in southwestern Wyoming.

Exxon has awarded a \$700,000 contract to Western Wyoming College for archeological studies which will assist them in the determination of a prospective route for a possible 150-mile extension of the pipeline that delivers CO₂ to Wertz and Lost Soldier Fields. Plans for the pipeline are still tentative.

Kerr-McGee plans to proceed with the injection of lean hydrocarbon gas into the Muddy Sandstone at Sand Dunes Field. The project is scheduled to begin early in 1991. Kerr-McGee estimates that an additional 16 to 18 million barrels of oil will be recovered from this project.

GLG Energy will use a polymer-augmented waterflood in the Sussex Sandstone at House Creek Field to recover an estimated 0.7 million barrels of tertiary oil. If all of these enhanced oil recovery projects

go as planned, an additional 64.3 million barrels of tertiary oil could be recovered.

Industry activity in southwestern Wyoming continues to accelerate in anticipation of a pipeline to carry gas from Opal, Wyoming, to southern California and because of increased markets for Wyoming gas in the Pacific Northwest and the Midwest. Kern River Gas Transmission Co. and WyCal Pipeline Co. are apparently both still in the race to build a Wyoming to California pipeline. Both companies placed orders for most of the large-diameter pipe needed for their respective pipelines and each claims they have signed enough firm transportation contracts to fill their lines. Both companies plan to begin construction later this year and to begin delivery of gas by late 1991.

Altamont Gas Transmission Co. is also moving ahead with plans to move Canadian gas and possibly some Wyoming gas to Opal and then through Kern River's pipeline to southern California beginning in 1993. The company has filed with the Federal Energy Regulatory Commission for an optional certificate to construct and operate the pipeline and has signed precedent agreements to ship 533 million cubic feet per day of the pipeline's 719 million cubic feet per day capacity. Meanwhile, a California Energy Commissioner stated that demand for natural gas in California by the year 2007 will be 2.5 billion cubic feet per day higher than at the present time.

At a meeting with the Wyoming Natural Gas Pipeline Authority and with Governor Mike Sullivan, Union Pacific Resources, Amoco, and Mobil unveiled future drilling plans in southwestern Wyoming. Union Pacific Resources and its partners should complete a 100-well drilling program on the Moxa Arch this year. Another 30

wells are planned on the arch for 1991. The company expects to drill 13 wells in the Church Buttes area and 18 wells in the Bruff area this year. Another 36 wells on the northern end of the Moxa Arch are planned within the next two years. Union Pacific completed 18 gas-producing wells on the Rock Springs uplift in 1989 and plans to drill 22 additional wells there in 1990.

Amoco plans to drill nine development and five wildcat wells this year on the Moxa Arch and in the Wamsutter area. Amoco also plans to drill 10 to 20 wells in these two areas in 1991.

Mobil will drill 15 new wells on the northern end of the Moxa Arch by 1992. Most of Mobil's gas in this area is presently shut in.

In a related item, Coastal Oil and Gas announced plans to drill 20 to 40 wells in the Riley Ridge area on the north end of the Moxa Arch to develop Frontier Formation gas reserves. Enron Oil and Gas drilled 30 Frontier Formation gas wells on the Moxa Arch in 1989 and has plans to drill 30 more Frontier wells each year, through 1993. In addition, Chevron, Texaco, and several independent operators are actively drilling in the Moxa Arch area.

Lease sales did well during the second quarter of 1990. The Wyoming Department of Public Lands' May sale netted the most revenue of any State sale since September, 1988. The high per-acre bid at this sale was \$270 by Bruce Evertson for a 400-acre tract that includes S/2 NW and S/2 section 26, T.13N., R.68W. Evertson recently drilled the 26-2 Warren Livestock well in NE NE section 26, T.13N., R.68W. and spudded the 26-3 Warren Livestock well in NW NE section 26, T.13N., R.68W. Both wells are 9,000-foot "J"

sand tests in Borie Field. No other details have been disclosed on either well.

The high per-acre bid at the U.S. Bureau of Land Management's (BLM's) April sale was \$275 by Wacker Oil for a 120-acre lease that includes NE SW and W/2 SE section 10, T.49N., R.72W. The tract is less than a mile southeast of Minnelusa oil production from Einar Field. Revenue from the June BLM sale was the highest since an October, 1988 sale. Prenalta Corp. made the high per-acre bid of \$240 at this sale for a 188.04-acre parcel covering Lots 9, 10, 11, and 18 of section 4, T.53N., R.69W. The tract is within a mile of Minnelusa oil production at York and Spring Hole Fields. Exxon made the sale's second highest per-acre bid at \$180 for a 1,600-acre lease that includes S/2 section 2, NE section 20, section 22, NE section 28, and W/2 section 34, T.21N., R.110W. The lease is five to eight miles southeast of the discovery well for Sugarloaf Butte Field, a new Dakota oil and gas field. This area of the Green River Basin has recently seen increased exploration activity for oil and gas in the Frontier and Dakota Formations.

If revenues from State and Federal sales continue on their present course, the revenue from 1990 sales should surpass the revenue generated from sales in 1985, 1986, 1987, and 1989.

The U.S. Bureau of Land Management (BLM), which has extended a directive, allowing temporary shut in of stripper wells and marginal wells to May 31, 1991, is planning hearings on further extensions of this directive. The BLM also will consider what tests or bonding requirements will be required to ensure that the shut-in wells will not pose an environmental risk or put the Federal

government at risk in regard to potential liability for unplugged wells.

Based on company data and on information compiled and published by Petroleum Information, the following significant exploration and development events occurred in Wyoming during the second quarter of 1990:

A. Mobil Oil set production casing at a Dakota prospect five miles west of Henry Field and five miles north of Taylor Ranch Field. The F22-33G West Flank Unit well was drilled in SE NW Section 33, T.14N., R.114W. No other details are available on this well.

B. Horizontal drilling is picking up momentum in Wyoming. Texaco Inc. plans to drill a shallow well with three horizontal legs at 120-degree angles to each other. The G634Y LaBarge Unit well will be drilled vertically in NE SW section 34, T.17N., R.113W., to a depth of 460 feet in the Aliny sand. Texaco will then drill three 200-foot horizontal radials, one to the southwest, one to the southeast, and one to the north.

C. Amoco Production is reportedly producing gas at a stepout well from the Legacy Field Dakota oil and gas discovery well drilled by General Atlantic in 1988. The Amoco 1 State of Wyoming A well was completed in the Frontier in SW NE section 16, T.22N., R.111W. It flowed gas at the rate of 1.1 million cubic feet per day.

D. Thermal Exploration's 11-14 Palmetto-Federal well in NW NW section 14, T.24N., R.109W., had shows of oil and gas on a drillstem test of the Mesaverde. The prospect is about five miles southeast of Frontier and Dakota production in the Blue Forest Field area.

E. There is increased activity in the Fort Union gas play in the Wind River Basin. TCF completed the Ester Fuller #4 well in NE SE section 26, T.36N., R.94W., in Fuller Reservoir Field. The well flowed 10.7 million cubic feet of gas per day from a total of 257 feet of perforations in ten separate sands. This is the fourth well that TCF has completed in this field since late 1987. Their Ester Fuller #1 well in SW NW section 25, T.36N., R.94W., had produced nearly 1.4 billion cubic feet of gas through March, 1990. Their Ester Fuller #2 well in NE NE section 26, T.36N., R.94W., produced an average of 905 thousand cubic feet of gas per day during March.

F. Chevron USA also completed a Fort Union gas producer in the Wind River Basin. The 14 Waltman Unit well in NE SE section 13, T.36N., R.87W., flowed 2.04 million cubic feet of gas per day from several Waltman sands.

G. Union Pacific Resources tested their 1 Celsius State 16-1 well in SW NW section 16, T.14N., R.94W., in the Almond Formation for one million cubic feet of gas per day. The well is in Dripping Rock Field which was discovered in 1984. Two other Almond wells in the field had produced a total of 9.7 billion cubic feet of gas through March, 1990, even though both wells are shut in during the summer.

H. Fuel Resources Development Co. has locations staked for nine coalbed methane tests in the Almond Formation near Baggs, Wyoming. The locations are all in T.12-13N., R.90W. These locations are near their A-11-12-90 Russell well in NE NE section 11, T.12N., R.90W., which is reportedly producing gas and water from the Almond.

I. Anderman-Smith Operating staked locations for four coalbed methane tests in the Hanna Basin. The tests are projected to depths that range from 4,500 to 6,000 feet in the Ferris Formation and they are all located in T.23N., R.81W.

J. Hornbuckle Field, discovered in 1984, has a new producing well. The 33-23 State well is in NW SE section 23, T.37N., R.73W. M.J. Kennedy Oil completed the well in the Sussex Sandstone flowing 300 barrels of oil per day.

K. In other horizontal drilling activity, Hondo Oil and Gas completed their 1-16H well with a bottom hole location in SW NW section 15, T.40N., R.78W. The well is in East Salt Creek Field and was completed in the Second Wall Creek for an initial pumping potential of 185 barrels of oil, 40,000 cubic feet of gas, and 269 barrels of water per day. Just to the southwest, Amoco plans to drill a horizontal test in the Second Wall Creek in Salt Creek Field. The well will bottom in section 25, T.40N., R.79W.

L. There is fairly active exploration in the Shannon Sandstone play in the Sheridan area of the Powder River Basin. Fields in the Powder River Basin which produce from the Shannon have a predominant northwest-southeast trend, and it is believed that sands in the Shannon were most likely deposited as bars on a mid or outer shelf. To the southeast in Campbell County, Hartzog Draw produced over five million barrels of oil from the Shannon in 1989. Ash Creek and Ash Creek South combined, have produced over 13 million barrels of oil from the Shannon in Sheridan County. In the nearly 80 miles between these two producing areas, there are very few wells that have produced from the

Shannon. True Oil is drilling a Shannon test in SE NE section 35, T.55N., R.83W., about 20 miles southeast of Ash Creek South Field. EOG recently completed their 1-6 Bates well in NE NE section 6, T.56N., R.83W., as a dry hole in the Shannon. Both wells are on trend between Hartzog Draw and Ash Creek.

M. Recluse Field has two new Minnelusa producing wells. Hondo Oil and Gas completed their 1 Sutherland-Federal well in NE SW section 11, T.56N., R.74W., for 55 barrels of oil per day. Just to the north in SE NE section 11, Yates Petroleum completed their Yates' 4 Calamity Springs well for 321 barrels of oil per day.

N. Quintana Petroleum completed a stepout from the Hugie Draw Field discovery well. The 1-19 Rocky Butte-Federal in NE NW section 19, T.57N., R.71W., was completed in the Minnelusa pumping 276 barrels of oil per day.

O. CNG Producing discovered oil in the Muddy Sandstone with their 23-20 Federal well in SE NW section 30, T.51N., R.71W. A drillstem test recovered nearly 1,000 feet of highly gas-cut oil. The well is about one mile northwest of Muddy production at Springen Ranch Field. The CNG well produced an average of 127 barrels of oil per day in March.

P. Martens and Peck Operating completed a shallow coalbed methane well in the Fort Union Formation. The 3-Walls-Fee well in SE NE section 30, T.51N., R.72W., flowed 640,000 cubic feet of gas and 330 barrels of water per day. The discovery is a mile southwest of Rawhide Butte Field, which also produces coalbed methane from the Fort Union Formation.

Q. Rainbow Ranch Field has a new Minnelusa producer. Apache Corp.'s 7 Rainbow Ranch Unit well in NE SW section 24, T.49N., R.71W. was completed for 823 barrels of oil per day.

R. DeKalb Energy has an apparent Minnelusa discovery about one mile northwest of Minnelusa production at Doe Field. A drillstem tests at the 32-27 Moser well in SW NE section 27, T.48N., R.73W., recovered 2,140 feet of gas and 525 feet of oil. No other details are currently available.

S. Petroleum Inc. added a new Minnelusa producer to Kiehl Field. The 7 Kiehl in NE SE Section 30, T.53N., R.67W., was completed for 166 barrels of oil and two barrels of water per day. This well extends the boundary of Kiehl Field to the northeast.

T. Cowan Oil Co. completed a horizontal Niobrara test in Silo Field flowing 2,000 barrels of oil and 500,000 cubic feet of gas per day. The 1 Warren well in NW NE section 11, T.15N., R.65W., is the first successful horizontal Niobrara test in the State. At last report, this well was flowing 500 to 600 barrels of oil per day through a 900-foot slotted liner in the horizontal segment of the well.

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Geological Survey of Wyoming

COAL UPDATE

In 1989, Wyoming retained its ranking as the top coal-producing state in the U.S., but only by a slight margin. The 171,140,004

short tons of coal produced in Wyoming last year was about 0.6 million tons more than the 170,515,184 short tons produced by Kentucky. When Wyoming became the Nation's leading coal producer in 1988, the State produced about 7.1 million short tons more than Kentucky. While Wyoming's 1989 production was a 4.6 percent increase over 1988, Kentucky recorded an 8.8 percent increase for the same period. West Virginia remained the third leading coal-producing state in 1989 with 152,544,262 short tons produced. A summary of the last ten years of coal production for the top five coal-producing states in the U.S. reveals that Wyoming became the third largest coal-producing state in 1980, the second largest producer in 1985, and the leading producer in 1988.

The Coal Journal (formerly the Kentucky Coal Journal) recently pointed out that although Wyoming was number one in coal production in 1988, it ranked only fifth in the Nation in value (The Coal Journal, 1990). Kentucky ranked first with coal valued at \$4.14 billion, followed by West Virginia (\$4.09 billion), Pennsylvania (\$2.11 billion), Illinois (\$1.67 billion) and in fifth place, Wyoming (\$1.50 billion). The value for each state was determined by multiplying total coal production by average mine price (in dollars per ton) using figures published by the Energy Information Administration (1989).

National coal production in 1989 is now reported at 980 million short tons, an increase of 27.3 million tons (or nearly 3 percent) over 1988 production. The top five coal-producing states accounted for about 625.9 million short tons (or nearly 64 percent) of the National total; Wyoming alone accounted for over 17 percent of the National total and about 45 percent of the 384 million short tons produced in the western United States.

The first quarter of 1990 saw monthly coal deliveries from Wyoming mines exceed deliveries for the same period in every past year. By the end of the first quarter, coal deliveries were already three million tons ahead of 1989's record pace. If this trend continues, Wyoming coal production in 1990 is certain to set another new record and could exceed the 177.1 million tons we have projected for this year. Coal production for Wyoming in 1990 will probably increase from three to seven percent over the past year's production. Our current estimate of 177.1 million tons in 1990 only requires a four percent increase in production. While the increase in first quarter production is 7.6 percent, it is still too early to change our current forecast.

Recently available data on the distribution and utilization of coal produced in 1989 (Energy Information Administration, 1990) indicates that Wyoming coal was used in 29 different states and overseas. Texas continued as the largest consumer of Wyoming coal in 1989, followed by Wyoming, Kansas, Oklahoma, Iowa, and Arkansas. Of the 20 states that used over 100,000 tons of Wyoming coal in 1988, ten states used less coal in 1989, seven states used more coal, and three states used about the same amount. An additional two states, Georgia and Ohio, also became consumers of more than 100,000 tons of Wyoming coal in 1989. Five other states that did not use Wyoming coal in 1988 reported coal deliveries in 1989. In total, seven more states used Wyoming coal in 1989 than in 1988 (Georgia, Ohio, New Hampshire, Alabama, Mississippi, Kentucky, and North Dakota).

Significant increases in Wyoming coal usage were recorded in Indiana (an additional 3.0 million tons), Texas (2.9 million tons), and

Minnesota (2.2 million tons). Significant decreases in usage were recorded in Illinois (1.3 million tons less), Wyoming (1.1 million tons), and Arkansas (0.8 million tons). Four states consumed almost 50 percent of Wyoming's coal; nine states consumed almost 80 percent of Wyoming's coal.

In 1989, electric utility companies located in 23 different states used 97.7 percent of Wyoming's total coal production to fuel industrial boilers and 10 states used Wyoming coal for residential/commercial heating. About 1.6 million tons (of the four million tons) in the "other industrial" and the "residential/commercial" categories went to Wyoming coal users, mostly other mineral-related industries. Four of the five trona plants in southwestern Wyoming used coal to generate steam for use in the refining process and in some cases, to produce electricity (cogeneration); many of the State's bentonite plants used coal in their refining process; and Mountain Cement Company used coal in their Laramie plant. Additional coal was used in FMC Corporation's synthetic coke plant in Lincoln County and in a sugar beet processing plant at Torrington.

About 86 percent of Wyoming's coal was shipped out of state in 1989, including 78,000 tons of coal that was exported out of the country. Ironically, about 240,000 tons of coal used in Wyoming in 1989 were imported from Colorado, Utah, Montana, Pennsylvania, and Coal Production District 8 (which includes parts of Kentucky, Virginia, Tennessee, and all of North Carolina). Most of the coal imported into Wyoming is used for "other industrial" purposes. In many cases, this imported coal is used in Wyoming because it is the closest available coal. In other cases, the imported coal may have specific properties or characteristics not presently available in Wyoming.

Transportation of Wyoming coal in 1989 was primarily by railroads (92 percent); coal transported by river/lake refers to coal that reached its final destination by barge after originating on a railroad. The 158.3 million tons of coal transported by rail in 1989 represents a 5.5 percent increase (or 8.2 million tons) over 1988.

Burlington Northern Railroad (BN) continues to dominate railroad haulage of coal in Wyoming as the company's 102.5 million tons of coal accounted for nearly 65% of all coal shipped by railroad. Coal shipments on BN are from coal mines in the Powder River Coal Field and exit the field (and the State) to the east, south, and north.

Western Railroad Properties, Inc. (WRPI), which reports tonnages carried by the Chicago and North Western Transportation Company (C&NW)/Union Pacific Railroad Company (UP) joint-venture railroad out of the Powder River Coal Field, carried 5.9 million tons (or 16 percent) more coal in 1989 than in 1988. The 42.9 million tons of coal reported by WRPI accounted for 27 percent of the railroad tonnage in Wyoming.

Southern Wyoming coal fields are served by UP; 10.3 million tons of coal or nearly seven percent of the total railroad tonnage in 1989 was hauled by UP. An additional 2.6 million tons of coal are hauled on Pacific Power and Light Company's (PP&L) private railroad line between Glenrock Coal Company's mine and the Dave Johnston power plant.

The increased tonnages of coal hauled out of the Powder River Coal Field each year since 1983 have almost been matched by a

corresponding increase in the amount of coal transported by the C&NW/UP joint venture. In contrast, coal tonnages hauled from southern Wyoming mines have decreased slightly since 1983 and reflect a plateau in coal production from this part of Wyoming. A slight yearly increase in the C&NW/UP joint venture's share of the total tonnage (transported out of the Powder River Coal Field) indicates that there is still keen competition between the joint venture and BN. This competition in rail rates and transportation contracts could, in part, be responsible for the increased production occurring at many of the mines in southern Campbell and northern Converse Counties that are served by both railroads.

In other coal transportation news, Santa Fe Pacific Corp. (SFP) has settled an antitrust lawsuit brought against them (and five other western railroad companies) by Energy Transportation Systems, Inc. (ETSI). The settlement is apparently the last (in a series) reached by the railroads and ETSI in connection with ETSI's claim that the six railroads conspired to block their proposed coal slurry pipeline from Wyoming to southern Midwest states. At the time of the settlement, SFP was appealing an earlier jury verdict that would have awarded ETSI damages of \$750 million. Following this recent settlement, SFP's appeal was dismissed by the 5th Circuit Court of Appeals. Under the settlement, SFP will pay ETSI a total of \$350 million over the next eight years. This recent settlement brings the damages awarded to ETSI up to \$600 million.

Arch of Wyoming's Pilot Butte underground coal mine north of Rock Springs began producing and selling coal in early 1990. Deliveries to PP&L's Jim Bridger plant

east of Rock Springs were noted in March of this year. Also, Pilot Butte apparently provided a test shipment of bituminous coal to either Taiwan or Japan earlier this year. However, plans to test burn coal from this mine at the Intermountain Power Project in Utah are evidently on hold for the time being.

Pacific Power and Light Company (PP&L) can now accept deliveries of coal via unit train at their Jim Bridger power plant east of Rock Springs. Completion of a railcar unloading facility at the plant in June allowed PP&L to test burn coal from Rochelle Coal Company's Rochelle mine in the Powder River Coal Field, delivered via unit train. PP&L planned to burn additional coal from the Powder River Coal Field during the third quarter of 1990 and coal from the Hanna Coal Field during the fourth quarter. No contracts or other information on these additional coal sales have been announced. Last year, PP&L completed an overland conveyer system at Jim Bridger that carries coal from the Jim Bridger mine to the power plant.

Developments in western and southwestern Wyoming

Builders of the proposed Thousand Springs power plant in northeastern Nevada continue work on permits and an Environmental Impact Statement. The \$4 billion project reportedly will be Nevada's largest construction project since Hoover Dam. At least part of the project's coal supply may come from Pittsburg and Midway Coal Mining Company's (P&M) Kemmerer mine in Lincoln County, Wyoming. P&M is one of the owners in the proposed 8-unit, 2,000-megawatt generating facility.

Developments in the Hanna Coal Field

Coal from the Hanna Coal Field was used in several test burns in the first half of 1990 as many utility companies looked closely at low sulfur coals in anticipation that more stringent clean air legislation will be passed by Congress this year. St. Joseph (Missouri) Light and Power tested coal from Rosebud Coal Sales Company's Rosebud mine at their Lake Road power plant; Missouri Public Service Company tested 18,000 tons of coal from Cyprus Shoshone Coal Company's Shoshone No. 1 mine at the Sibley, Missouri, plant; and Illinois Power Company has tested coal from Arch of Wyoming's Medicine Bow or Seminoe II mines. Illinois Power is evidently trying to decide whether to install scrubbers at their plants (to reduce emissions from burning high-sulfur coal) or burn low-sulfur coal. While three of Illinois Power's largest power plants will probably install scrubbers so they can burn coal from the Illinois Basin; the utility's smaller power plant will likely burn low-sulfur coal, hopefully from the Hanna Coal Field. Test shipments of Hanna coal have also reportedly gone to Japan (and possibly Taiwan). Apparently Arch of Wyoming's Medicine Bow mine supplied the coal exported to Japan. It is hoped that these test burns will result in either some new contracts for Hanna coal mines or at least create some significant sales on the spot market.

Another coal sale from the Hanna Coal Field was reported during the second quarter of 1990. Ontario Hydro announced that it was purchasing 300,000 tons of coal from both the Medicine Bow mine and the newly-opened Bull Mountain mine in Montana (operated by Meridian Minerals) for use in Canadian power plants. Actual amounts of coal from each were not announced. The Canadian utility appears to

be facing the same problem as its counterparts in the United States, i.e., how to reduce sulfur emissions from its power plants in the most economical way. Unless expensive scrubbers are installed to allow the burning of high-sulfur coal from local sources, the best available option is the purchase of low-sulfur coal.

Developments in the Powder River Coal Field

The controversial JY Ranch exchange, in which Federal coal near Sheridan, Wyoming, was to be exchanged for a scenic easement on some private land surrounded by Grand Teton National Park, was approved by the U.S. Secretary of the Interior in May, 1990. Under the exchange agreement, Sloan-Kettering Memorial Institute received title to a 2,560-acre tract of Federal coal and the Federal government received a scenic easement on 1,106 acres of land on the JY Ranch. The scenic easement insures that the land (along Phelps Lake) will never be developed, even though the land will still be under private ownership. Within hours after the exchange was approved, Sloan-Kettering announced that Consolidation Coal Company had purchased the 207 million tons of coal under the exchanged tract for \$5.6 million or about 2.7 cents per ton. Consolidation Coal Company, which also owns interest in the CX Ranch coal property in Montana near the newly acquired coal tract, has not yet announced any specific plans for developing the tract. Shortly after Interior approved the exchange, the State of Wyoming filed a suit to overturn the decision.

The Fort Union mine north of Gillette has been sold by Total American Mining Corporation, an American subsidiary of the French Total conglomerate, to Fort Union Limited Partners, an anonymous group of investors. Although the investors were not

divulged, industry sources indicate that the Drummond Company, Inc., an Alabama-based coal company, may be the new owner. The Fort Union mine produced 42,092 tons of coal last year and employed nine people. Following the sale, five of nine mine employees were laid off. Coal production at the mine has been shipped to Midwestern utilities, used as feedstock in the nearby K-Fuels coal beneficiation plant, and reportedly blended with other coal and exported. The mine contains coal reserves of about 200 million tons.

Coal Contracts - Powder River Coal Field

Purchasing activities in this coal field were numerous during the second quarter as more and more utility companies purchased coal on the spot market for use in test burns. In addition, some coal was purchased to blend with higher sulfur and higher heat value coals, and some coal was purchased to supplement existing longer-term contracts. In the first quarter, spot coal sales accounted for 8 to 12 percent of the total coal delivered to electric utilities each month from Wyoming mines.

Coal purchased for test burns is summarized below:

1) Tennessee Valley Authority (TVA) purchased 100,000 tons of coal from Mobil Coal Producing, Inc.'s Caballo Rojo mine for use at the utility's Paradise, Kentucky, power plant. The coal will be used in one of the units at Paradise that is not yet equipped with a scrubber.

2) In June, NIPSCO began to test burn 130,000 tons of coal from Peabody Holding Company's Rochelle mine. The burn is at the Schahfer No. 15 unit in Indiana.

3) Southern Company Services Inc. (SCS), the fuel purchasing agent for Georgia Power Company, is purchasing an additional 1.0 million tons of coal from both Amax Coal Company and Mobil Coal Producing, Inc. for use at Georgia Power's Scherer, Georgia, Facility. The coal is an addition to the 492,000 tons purchased for tests conducted during the second quarter of 1990. Most of the Wyoming coal is blended with higher sulfur Eastern coals to reduce sulfur emissions.

4) SCS also purchased an unannounced amount of coal from Thunder Basin Coal Company's Black Thunder mine for its subsidiary, Alabama Power Co., to use in the Miller plant, a generating facility near Birmingham, Alabama.

5) St. Joseph (Missouri) Light and Power Company tested coal from Thunder Basin Coal Company's Black Thunder mine at the Lake Road, Missouri, power plant.

6) Detroit Edison Company test burned coal from Cordero Mining Company's Cordero mine, Mobil Coal Producing, Inc.'s Caballo Rojo mine, and Peabody Holding Company's Rochelle mine at the St. Clair and Monroe, Michigan, generating plants.

7) Fremont (Nebraska) Department of Utilities test burned coal from both NERCO Coal Company's Antelope mine and Amax Coal Company's Belle Ayr mine in May to determine which company would get a 5-year coal supply contract. See item (2) below for details of the new contract.

New coal contracts signed with Wyoming mines are briefly summarized below:

1) Triton Coal Company (a division of Shell Mining Company) is now delivering an undisclosed amount of coal from the Buckskin mine to the Jose Portillo generating plant in Mexico. The Mexican state utility company, Comision Federale de Electricidade, is purchasing the coal to supplement the mine-mouth, high-ash, subbituminous coal currently supplying the plant. The coal is shipped via Burlington Northern Railroad Company (BN) to Fort worth, Texas, where it is switched to the Southern Pacific Railroad for transport to Eagle Pass, Texas. At Eagle Pass, along the Texas-Mexico border southwest of San Antonio, the coal is switched to the Mexican-owned F&M Railroad and transported the final 10 miles to Portillo.

2) Amax Coal Company's Belle Ayr mine will supply from 125,000 to 150,000 tons of coal per year for five years to Fremont (Nebraska) Department of Utilities. The 8,450 Btu/pound coal sold for \$4.05 per ton F.O.B. mine and \$13.85 per ton delivered on C&NW. This contract calls for annual price negotiations.

3) Wisconsin Power and Light Company (WPL) purchased 200,000 tons of spot coal from Cordero Mining Company's Cordero mine for use during the second quarter of 1990 at Unit 2 of the Columbia, Wisconsin, power plant. WPL will purchase another 200,000 tons of spot coal from Mobil Coal Producing, Inc.'s Caballo Rojo mine for use during the third quarter of 1990 at the same unit.

4) Cordero Mining Company (a subsidiary of Sun Coal Co.) will supply between 150,000 and 200,000 tons of short-term contract coal to Grand Island Nebraska Electric Department from the Cordero mine

south of Gillette. The coal will be delivered to Grand Island via C&NW and UP railroads through October, 1990.

5) Cordero Mining Company supplied 150,000 tons of spot coal from the Cordero mine to Iowa Public Service Company's (IPS) George Neal No. 3 unit near Sioux City, Iowa. This is replacement tonnage for part of the 1.5 million tons of coal that Carter Mining Company was to provide to IPS during 1990. Evidently, Carter Mining Company was unable to supply some of the coal needed by IPS because they were installing a new conveyor belt system at their Caballo mine.

6) Cordero Mining Company will also supply Iowa Southern Utilities Company with 300,000 to 400,000 tons of spot coal. BN will transport the coal to the Ottumwa, Iowa, plant between April and December, 1990.

7) Mobil Coal Producing, Inc. will supply 220,588 tons of spot coal from the Caballo Rojo mine to Units 1 and 2 of Lower Colorado River Authority's (LCRA) Fayette (Texas) Power Project. This solicitation had bids from \$3.30 per ton to \$5.15 per ton F.O.B. mine. LCRA accepted and approved Mobil's bid of \$3.90 per ton F.O.B. mine. Delivered price of the coal was 118.42 cents per million Btu's, or about \$20.13 per ton for 8,500 Btu/pound coal.

8) Thunder Basin Coal Company's Black Thunder mine and Rochelle Coal Company's Rochelle mine in southern Campbell County have both signed long-term coal contracts to supply fuel to boilers operated by Texas Eastman Company at Longview, Texas. No details concerning prices, amounts, or contract lengths were released.

9) Nerco Coal Company's Antelope mine will supply an unspecified tonnage of coal to some of Detroit Edison Company's generating plants in Michigan. Solicitations had been requested for up to one million tons of coal in 100,000-ton increments.

10) Undisclosed coal mines in the Powder River Coal Field will be supplying an unspecified amount of coal to Arch-Daniel-Midland Company's manufacturing plants at Decatur, Illinois, and Cedar Rapids, Iowa, during the second half of 1990. Although no details were available, past solicitations have been on the order of 200,000 to 400,000 tons for this time period.

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INDUSTRIAL MINERALS UPDATE

Aggregate (construction)

Construction aggregate is sized rock material (sand and gravel or crushed rock) with specific physical properties and good durability. The production of construction aggregate in Wyoming increased during the second quarter of 1990 as several highway construction projects were initiated.

Meridian Minerals is producing railroad ballast, a kind of construction aggregate, at Granite, west of Cheyenne. While production of ballast at this facility continues, the Burlington Northern and Union Pacific Railroads continue to look for additional ballast sources in Wyoming. One area near Wheatland has been tested for a source of ballast for the Burlington Northern. The rock meets ballast specifications. Lease and access negotiations are currently (July, 1990) underway with the land and mineral owners.

Aggregate (decorative)

Decorative aggregate is sized rock produced for its color or other aesthetic qualities and it must have certain physical qualifications (strength, resistance to acid, etc.). Decorative aggregate is used in colored prestressed concrete, roofing granules, landscape rock, building faces, etc. Georgia Marble produces decorative aggregate from white marble at a plant in Wheatland. This material is available in several sizes down to the rock flour used to color smooth white concrete and white polyvinylchloride (PVC) pipe.

In July, several test samples of various colored aggregates were shipped from Wyoming to a producer of decorative tile. The Geological Survey of Wyoming also has several displays of decorative aggregate. These are available for inspection in the Geological Survey building in Laramie. Interested persons should call Ray E. Harris at (307) 766-2286.

Bentonite

There are still no indications that 1990 production of bentonite in Wyoming will be much different than 1989 production. The primary use of bentonite is in oil and gas well drilling. While other uses, such as pond lining, foundry binders, taconite pelletizing, and cosmetics have increased, these increases have not offset declines in demand related to the drilling of much fewer oil and gas wells. Because of excess capacity, Wyoming's bentonite industry is capable of rapidly increasing production to meet any demand.

Cement

Mountain Cement's plant at Laramie is the only cement plant in Wyoming. The plant is apparently operating at or near capacity and mines its basic raw materials locally.

Dimension and decorative stone

As part of an ongoing project, the Industrial Minerals Division of the Geological Survey of Wyoming has prepared over seventy cut and polished samples of decorative rock from Wyoming, some suitable for dimension stone. These samples are available for inspection in the Geological Survey building in Laramie. Interested persons should call Ray E. Harris at (307) 766-2286. These

decorative rocks are suitable for use as facing materials, in floors, in walls, as tile, and as shaped and polished decorative stone.

As an outgrowth of the Industrial Minerals Division's project, several samples of decorative marble, quartzite, limestone, and granite were cut and polished and shown to a variety of users, including experts in the Italian stone industry in Carrara and Verona. A new company, Sunrise Stone, was formed in the second quarter of 1990 and registered with the Wyoming Secretary of State's Office. This company is studying the feasibility of producing decorative stone and dimension stone (blocks, slabs, and tiles) in Wyoming.

Fertilizer, fertilizer ingredients, and related products

Fertilizer is manufactured in Wyoming at the Chevron Chemical Company's plant near Rock Springs. In addition, anhydrous ammonia, nitric acid, ammonium nitrate, carbon dioxide, and urea are produced from natural gas, water, and air at the Coastal Chem, Inc., plant west of Cheyenne. These products are used as ingredients in fertilizer and as industrial chemicals. Coastal also cools carbon dioxide to produce dry ice, which is sold as blocks and pellets in the Rocky Mountain area.

Gypsum

In Wyoming, gypsum is produced at two plants in the Bighorn Basin (near Cody and at Himes, between Lovell and Greybull). Production at these plants is continuing at levels near capacity. These plants produce wallboard that is marketed regionally and in the Pacific Northwest. Mountain Cement also mines gypsum near Laramie for use in producing cement.

Limestone

Limestone is the preferred crushed rock for use as road surfacing aggregate and base and sub-base material on Wyoming highways (see Construction Aggregate). Wyoming limestone is also used to control emissions from the Laramie River Station power plant near Wheatland. A light tan- to buff-colored limestone from the Mississippian Guernsey Formation is currently being tested for use as polished tile (see Decorative Stone).

Silica

Development of the silica resource near Cassa, in Platte County has been put on hold due to a labor dispute within the company that has leased the deposit. Over 100 million tons of high-grade silica have been identified at that site. The Geological Survey of Wyoming is continuing to investigate other silica deposits near Lovell, north of Laramie, and east of Glendo. Interest in silica deposits in Wyoming has continued into the second quarter of this year although no additional property has been acquired by private companies.

Wyoming silica may be suitable for the production of several kinds of glass, for high purity silica (SiO_2) and glass pellets, for foundry sand, and for hydraulic-fracturing sand. Because soda ash (refined trona) is a major ingredient in the manufacture of glass and since 90 percent of the soda ash produced in the U. S. comes from the trona patch near Green River, Wyoming, the cost of transporting raw materials to glass plants could be saved if glass was manufactured near the raw materials in Wyoming.

Trona

Demand for Wyoming soda ash, which is produced from mined trona, continued at record levels during the second quarter of 1990. This year promises to be even better than the record production of last year. The increase in demand is related to the manufacture of sodium cyanide for use in gold refining, the substitution of soda ash for caustic soda in many industrial processes, and growth in export markets. The best potential for even greater demand still lies in exports.

In the second quarter of 1990, Rhone-Poulenc announced modernization plans for their plant, which will increase its production capacity by 17 percent (the capacity will increase from 1.96 million tons to 2.3 million tons of processed trona per year). Tenneco also announced plans to increase production but through plant expansion. To do this, Tenneco has applied to the Wyoming Industrial Siting Administration for an amendment to their existing permit, rather than seek a new permit. According to Tenneco, the amendment process would be faster and less costly. The other trona producers, TG, FMC, and General Chemical have previously announced expansion plans.

Zeolites

Zeolites are a group of silicate minerals with unique properties of ion exchange and adsorption. Although most zeolites are currently manufactured synthetically, natural zeolites are already produced in small quantities in several western states (Harris and King, 1990). Recently, however, there has been a concerted move to mine and refine natural

zeolites. Because mined zeolites cost less than those produced synthetically, there is the potential that production of natural zeolites could follow the example of the trona industry. Soda ash, produced from mined trona, has replaced all of the synthetically produced soda ash in the U. S., and has also significantly replaced synthetic soda ash in many other areas of the world.

For a similar conversion to the mining of natural zeolites, large, high-grade deposits of natural zeolites must be found and developed. There are several areas in Wyoming that hold promise for such development (Harris and King, 1990).

In Wyoming, Rocky Mountain Zeolites is developing a deposit located near old Fort LaCledé, in the Washakie Basin in Sweetwater County. Rocky Mountain Zeolites is planning to market natural clinoptilolite (a specific zeolite mineral, $\text{Na}_6[\text{Al}_6\text{Si}_{30}\text{O}_{72}]\cdot 24\text{H}_2\text{O}$) for use in removing ammonia from aquaculture, agriculture, and waste-water treatment products. It can also be used to remove unwanted ions from water, radioactive waste, hazardous waste, and air. The clinoptilolite will be producible in several different sizes.

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URANIUM UPDATE

The only uranium production in Wyoming in the second quarter of 1990 was at Power Resources (London Central Energy) in-situ, solution mining operation at the Highland mine in Converse County. Malapai Resources in-situ operation west of the Pumpkin Buttes, which was closed by its holding company (Pinnacle West Capital Corp.) in January, was sold to Electricité de France (EdF). As of early July, the new owners of Malapai had not begun mining.

COGEMA's Pathfinder Mines is continuing to strip overburden and mine and stockpile ore at the Shirley Basin mine. Mill production of yellowcake from Shirley Basin is planned to resume in late July of this year. All active uranium operations in Wyoming are now Foreign-owned.

Wyoming was the Nation's fifth largest producer of uranium in 1989. In 1990, Wyoming may become the 4th largest uranium-producing state since the only mine in New Mexico has apparently shut down. Although the production of uranium from Wyoming is expected to diminish in 1990 due to the closure of Malapai and the temporary closure of COGEMA, production should increase again in 1991.

Uranium prices increased a little at the start of the third quarter, going from \$8.80 per pound of U_3O_8 to over \$11.00 per pound. To put this in perspective, uranium prices in the 1950s were \$6.00 to \$8.00 per pound. In early 1979, prices reached \$42.00 per pound. Currently, purchasers of uranium are finding that stockpiles of mined uranium from the early 1980s are being depleted. As a result, the price of uranium is increasing.

and, according to one industry official, may reach \$16.00 per pound by year's end.

In a promising development, Kennecott Corp., which paid \$1 million to U. S. Energy-Crested Corp. (USE-CC) to examine the Green Mountain uranium property south of Jeffrey City, decided to purchase 50 percent of the property for \$15 million dollars, and agreed to fund the first \$50 million dollars of development work. There are also additional financial arrangements, dependent on production and uranium prices. Kennecott Corp. is owned by RTZ, of Great Britain, which also owns Rio Algom, a company that is conducting evaluations of uranium properties in the Powder River Basin for possible development as in-situ solution mining operations.

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METALS AND PRECIOUS STONES UPDATE

Several companies conducted preliminary reconnaissance studies in Wyoming (principally for gold and copper) in the spring and several more intended to explore later in the summer. However, the recent decline in gold prices also put a damper on several projects.

Some exploration was reported in the Keystone district of the Medicine Bow Mountains, the Rattlesnake Hills of the Granite Mountains, the South Pass region of the Wind River Range, and the Sunlight district of the Absaroka Mountains. The Geological Survey of Wyoming continued

studies of the Seminoe Mountains gold district, and continued searching for evidence of kimberlite deposits in the central Laramie Mountains and Medicine Bow Mountains.

Cody area hot springs

Anyone who has driven along U.S. Highway 16 west of Cody near Buffalo Bill reservoir, is probably aware of the sulfurous hot spring deposits. A large area along the western edge of town is covered by fairly recent hot spring deposits. Several of these were sampled by the Geological Survey of Wyoming last winter to test for evidence of epithermal precious metal mineralization. Of 8 cinder and sulfur samples collected, no anomalous gold or silver was detected.

Kirwin district, Absaroka Mountains

The Kirwin district in the Absaroka volcanic plateau of northwestern Wyoming encloses a major copper-silver porphyry in Tertiary andesites and felsic breccia. The deposit is Wyoming's largest copper ore body. The porphyry was reported by the U.S. Bureau of Mines to host a 70-million-ton ore body averaging 0.75% copper. One informed source suggests that the actual size is 2 to 3 times that reported by the Bureau of Mines.

In the October, 1985, issue of Rocky Mountain Pay Dirt (p. 32A), reserve figures reported by AMAX included 1.23 billion pounds of copper, 121,000 ounces of gold, and 5.6 million ounces of silver. The porphyry also carries significant lead, zinc, and molybdenum. Based on these available reserve figures, the Kirwin porphyry hosts metals that are worth more than \$1.5 billion based on average 1989 prices.

Currently, the U.S. Forest Service is proposing to purchase the property and ore body for \$3.3 million. The Forest Service plans to protect the historic values and animal habitats in the area if it buys the property (Casper Star-Tribune, April 14, 1990, p. B1), which could result in it never being mined and developed.

Precious Stones

Exploration for diamond deposits resumed this summer, with the Geological Survey of Wyoming searching the central Laramie Mountains for indications of daimondiferous kimberlite and lamproite. The project was expanded into the Medicine Bow Mountains in the vicinity of Mullison Park where two diamonds were discovered in 1977. Geophysical surveys are planned in areas where anomalies were identified in previous years.

Seminole Mountains

The Geological Survey of Wyoming initiated 1990 field studies in the Seminole Mountains greenstone belt in June. Analyses of two samples, which were collected last field season, contained elevated silver values indicating portions of the iron formation in the district are mineralized.

Sierra Madre

Samples collected last fall from an unnamed mine in NE SW section 11, T.15N., R.87W. of the Sierra Madre contained galena. Assays of these lead-bearing schists produced anomalous gold, copper, zinc, lead, and silver. One sample contained 3.54% lead and 24 ounces/ton silver.

South Pass

Mining companies are showing greater interest in the South Pass gold deposits this year. The gold deposits are principally epigenetic deposits hosted by a variety of rock types. The most common host rock is metagreywacke followed by amphibolite, meta-andesite, greenschist, actinolite schist, and metatonalite (Hausel, 1990a).

This spring, a few major mining companies conducted brief reconnaissance studies of the greenstone belt and the Geological Survey of Wyoming was asked to lead field trips into the region for several companies as well as for the Geological Society of America (Hausel and Hull, 1990). The GSA field trip was attended by representatives of four major mining companies, as well as consultants and other individuals.

Titanium

A study of the State's titanium resources was recently completed by the Geological Survey of Wyoming (Hausel, 1990b). The report concludes that the State, as a whole, has one of the largest titanium resource bases in North America. Titanium is an important metal with industrial applications (Harris, 1990), and also is an important strategic metal with commercial, military, and aerospace applications.

The known titanium deposits include numerous (Cretaceous) paleobeach placers exposed on the flanks of nearly every major basin in Wyoming, and also some large (Proterozoic) magmatic deposits such as the anorthosite batholith of the Laramie

Mountains and the Lake Owen layered gabbroic complex. These titaniferous deposits also have associated minor minerals and metals of potential economic value. Some accessories include gold, vanadium, chromium, monazite, and zirconium.

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(Editor's note: This article was written prior to the crisis in Iraq. Recent conflict in that area will obviously have an effect on oil and gas activity.)

Wyoming Agricultural Outlook

A major concern to U.S. and Wyoming agriculture as we head into the fall, is not the usual uncertainties connected with weather or production, but the impacts of the situation in Iraq and the OPEC oil producing countries. Rising energy prices will have negative impacts on all phases of production and marketing of agricultural products. High energy costs for production and harvesting has been felt immediately by all sectors of the industry. Higher transportation, processing and storage costs transfer into farm-gate prices lower than projected as recently as early August. A larger negative impact on production costs for 1991's production is almost assured. Upward moving energy prices will be felt in all areas--from higher fertilizer prices to new equipment and replacement parts. Additionally, there is a high probability that a new round of inflation will impact the U.S. economy. It will take very skillful management on the part of the Administration and the Federal Reserve System to keep inflation at manageable levels for the next few years.

GRAINS OVERVIEW

Since March, the weather and farmers' planting intentions have modestly lowered the USDA's estimate of U.S. corn, sorghum, soybean and winter wheat output in 1990/91. Nonetheless, total U.S. wheat production is still expected to rise sharply from a year earlier, while the corn crop likely will be up only slightly. A warmer, wetter spring is behind the changes. Over the entire U.S., this past May was the sixth wettest since 1895.

Weather and production problems have had mixed impacts on the food and feed grain situation this past summer. The total U.S. wheat crop is an estimated 2.71 million bushels, 33 percent above last years production. Average yield is expected to average 38.7 bushels per acre, 5.9 bushels higher than last year. Increased 1990 production coupled with the USDA's upward revision of carryover stocks, result in total wheat supplies to be over 3.2 billion bushels. This large supply will be modestly bearish for average farm prices, now forecast to be \$2.80-\$3.20 for the 1990/91 year. That's compared to \$3.72 a year earlier. Producers must bear in mind that world wheat production is likely to be record high, and so unanticipated U.S. exports are not likely to materialize. Unless a shooting war breaks out in the near east, it may be difficult to justify delaying marketing decisions into 1991, especially if producers are paying for commercial storage.

Weather developments in the corn and soybean areas of the U.S. resulted in fewer planted acres of both crops, and thus has put upward pressure on prices of these commodities. Corn production is forecast to be about 4 percent above last year, at 7.85 billion bushels. This is still 3 percent below earlier forecasts. A great deal of late corn was planted, and this results in greater harvest risk, should a repeat of 1974's labor day frost materialize. Although an early frost is not likely at the time of this writing, if it should occur feed grain prices will take a sharp jump upward. This would also be bullish for barley and other feed grains marketed in Wyoming.

LIVESTOCK SITUATION

The July 1, 1990 USDA midyear cattle inventory report provided further confirmation that rebuilding the nation's cattle herd is proceeding at a snail's pace. As a result, feeder cattle supplies are expected to remain tight and beef production is unlikely to post any significant increase during the year ahead. The slower inventory growth will keep cow-calf operators in the financial drivers seat for another year.

The midyear cattle count was estimated by USDA at 108.9 million head. This estimate was about the same as last year and marked the third year with inventory estimates ranging from 108.5-108.9 million head. Along with little change in the total inventory, the cow herd remained about the same as last year, at 44.4 million head. Both the dairy and beef cow herds were unchanged from a year ago.

The number of heifers held as cow herd replacements suggests future inventory growth will be modest, at best. The number of heifers held as dairy cow replacements were reported 4 percent below last year and the lowest since 1979. In contrast, heifers being held as beef cow replacements were 4 percent above a year ago and the largest since 1984. It should be noted that in recent years only about one-third of the July 1 intended cow herd replacements actually entered the cow herd during the July-December period. In addition, it is evident that with few new heifers entering the cow herd in recent years the average age of the cow herd is aging. As a result, more of the intended herd replacements will merely replace older cows rather than become net additions to the size of the cow herd.

Beef production is expected to be virtually level for this year. Cow slaughter is

down, although this does not necessarily signal the long-awaited upturn in the cattle cycle. Cattle prices were very strong early in the year, but have slipped since April although upward pressure on fed cattle prices should begin materializing before the end of the year. Fed cattle prices will continue to vary on a seasonal basis, however they should trade higher than year-earlier levels throughout the fall period.

Cattle feeding margins will continue to be pressured, as recent world events coupled with high feeder cattle prices are reflected in bottom lines this fall. Estimated returns from feeding 7-800 pound feeder steers dropped near breakeven in July after averaging near \$20 per head during the first half of the year. Projected breakevens for feeding 7-800 pound feeder steers range near \$77 in September, but are likely to rise to the \$80 area during the late fall months. Widespread wheat feeding in the Southern Plains will help lower gain costs, but may not be sufficient to offset higher corn and energy costs.

Cattle feeders, backgrounders, and cow-calf operators will continue to compete for available supplies of replacement cattle. The estimated inventory of feeder steers and other heifers (not held as cow herd replacements) weighing over 500 pounds on July 1 was only about 1 percent above last year. In contrast, the residual supply of calves under 500 pounds was about 1 percent smaller than a year ago on July 1. Thus, calculated total feeder supplies are about unchanged from last year, and 5-7 million head below the levels of the mid 1980's.

Calf prices will remain strong this fall, although slightly lower than earlier estimates, due to the mid-east situation and higher feed grain prices look for prices to trade in the low to mid \$90 area, marginally lower than last year's record prices for the same period.

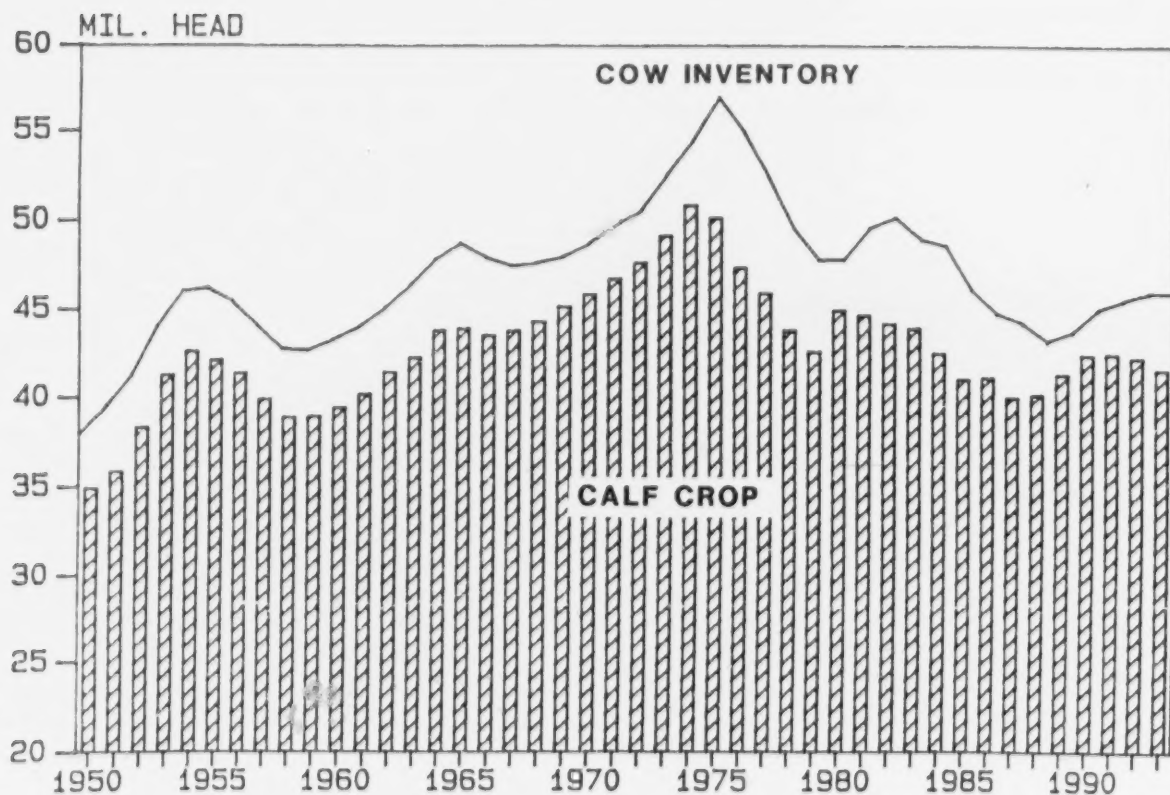
These historically strong fall prices will pose a challenge for cattlemen with heavy weaning calves who consider backgrounding or finishing this year's calf crop. Expected high prices will make it difficult to pencil in a favorable return, even for high performance programs. As of late August, the best alternative appears to sell close to weaning,

unless the producer has an excess amount of forage feed that cannot be readily sold, and must be marketed through livestock.

Robert D. Carver
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COW INVENTORY AND CALF CROP

FORECAST 1989-93



Western Livestock Marketing Information Project
Cooperative Extension Service

Job Openings Outlook

ECONOMISTS

Economists study how people use resources such as land, labor, and capital. They may analyze the relation between supply and demand and determine ways in which goods are produced, consumed, and distributed. They may study problems such as inflation and recession or carry out studies for government to assess economic conditions and the need for changes in economic policy.

Economists must have the ability to analyze and reason and the ability to work with detail. They must also have above average numerical ability and the ability to express oneself both verbally and in writing.

Economists employed by colleges and universities have flexible work schedules, dividing their time among teaching, research, and administrative duties. Some act as consultants. Those who work for government agencies and private firms have more structured schedules. Economists often work alone or they may work as part of a research team on an assigned project. Most work under pressure of deadlines, tight schedules, and heavy workloads. They sometimes must work overtime. Economists may do some traveling to collect data or attend conferences.

Although a bachelor's degree with a major in economics is the minimum requirement for employment, many employers prefer a master's degree. A doctoral degree is essential for attaining a professorship in most colleges and universities and is commonly required for directors of research

projects, administrative positions, or consultants.

The outlook for economists is balanced to a slight surplus of applicants. In Wyoming, limited funding for economists has decreased job opportunities. Competition is keen and opportunities are best for graduates with advanced degrees, solid work experience, and geographic mobility. Evidence of independent, scholarly activity or involvement in community problems may also be helpful in obtaining a job.

Wages for economists with bachelor's degree are \$24,400 annually. The median annual salary of business economists is \$56,000. Economists entering into the federal government having a bachelor's degree average \$15,800 annually; having a master's degree average \$23,800; and having a doctoral degree average \$28,900 annually.

MARKET RESEARCH ANALYSTS

Market research analysts compile information that companies use to make decisions on their products and services. Data users may be classified into two broad areas: consumer and industrial. Research techniques and the information to be gathered differ considerably; analysts usually specialize in one area or the other. In the consumer field, they study the buying public and its wants and needs. Analysts select a group of people to be interviewed who accurately represent customers, and design

survey questionnaires. They analyze the data on customers' opinions which have been gathered through personal, telephone, and mail surveys. Industrial marketing emphasizes the current and future needs of industry and government as consumers. In this field, analysts gather and interpret information both inside and outside the company. They may talk to company officials and use such sources as company record, trade journals, government reports, financial publications, and industry-wide statistics. In both areas, analysts present their findings in concise, clearly written reports, summarizing their conclusions, making recommendations, and proposing alternative courses of action when possible. They may present the report orally.

Market research analysts must have above average use of words and numbers and the ability to catch on to things. They must have average ability to perceive pertinent detail in verbal or tabular materials, good judgment, a preference for working with people, and the ability to analyze problems objectively. Market research analysts usually work in an office. However, most spend part of their time traveling, sometimes within a

relatively small area and sometimes long distances. To meet deadlines, they may work long hours, including nights and weekends.

A bachelor's degree, preferably in marketing with a concentration in research, is usually sufficient for a trainee position. Graduate study is required for advancement. A Master of Business Administration (MBA) is almost essential for a job with large corporations. Employers indicate a preference for those who can work independently with minimum supervision. There is a balance to slight surplus of qualified applicants for market research analysts' positions.

Average earnings for market research analysts are \$35,000 a year. The mean ranges between \$26,000 and \$47,000. Ten percent of market research analysts earn less than \$21,000 and another ten earn more than \$52,000.

Suzanne McGuire
Research Assistant, WCIS

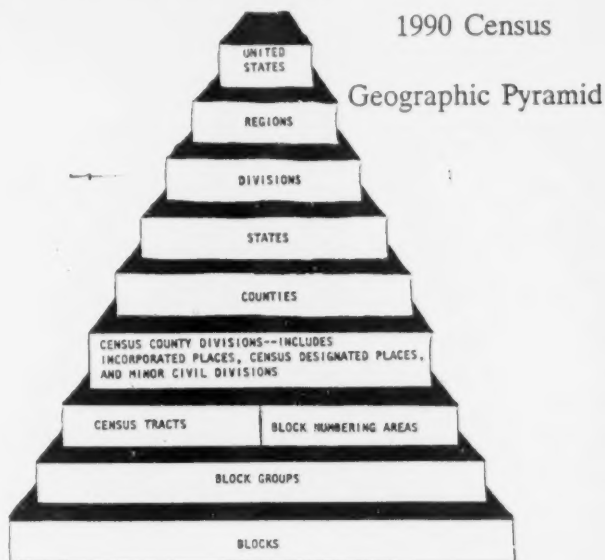
1990 Census: Geography Lesson

When the 1990 Census data becomes available it will be used by many individuals for a variety of purposes. For example, before implementing a program of adult literacy and English-as-a-second-language instruction, Population and Housing characteristics could be used to determine the number of people 25 years old and over who had less than an 8th grade education, persons 18 and over who didn't speak English, or persons 18-59 who were living in poverty. This information could then be used to determine potential need for reading, writing, and English language instruction in an area; to assess the best areas to concentrate advertisement; and the classroom location which would be convenient to most potential users. But before using Census data it is necessary to find out the kinds of geographic areas analyzed by the Census Bureau. For instance, in the above example, Census data could be used from Census Tracts and Block Numbering Areas. However, many other geographic areas, both larger and smaller, are available.

The Geographic Pyramid below indicates the major breakdowns for which the Census Bureau can provide data. The U.S. is the largest unit but there are also four Regions, each with an average of two or three Divisions (Wyoming is in the West Region, Mountain Division), followed by States and Counties. Data is further divided into Census County Divisions (CCD's). CCD's are statistical subdivisions of a county and include incorporated places such as towns and villages, minor civil divisions, and Census Designated Places (CDP's) which are densely populated centers without legally defined corporate limits or powers.

The smallest unit for which written reports will be available are the Census Tract (inside Metropolitan Statistical Areas) and

Block Numbering Areas (outside Metropolitan Statistical Areas). Average population for these areas is 4000. The last two areas, Block Groups and Blocks, have average populations of 1000 and 100 respectively and information for these areas will only be available on microfiche, computer tape and other products. While Blocks are basically city blocks in town, in rural areas they may be quite a bit larger. The 1990 Census is the first to report Block areas for the entire country.

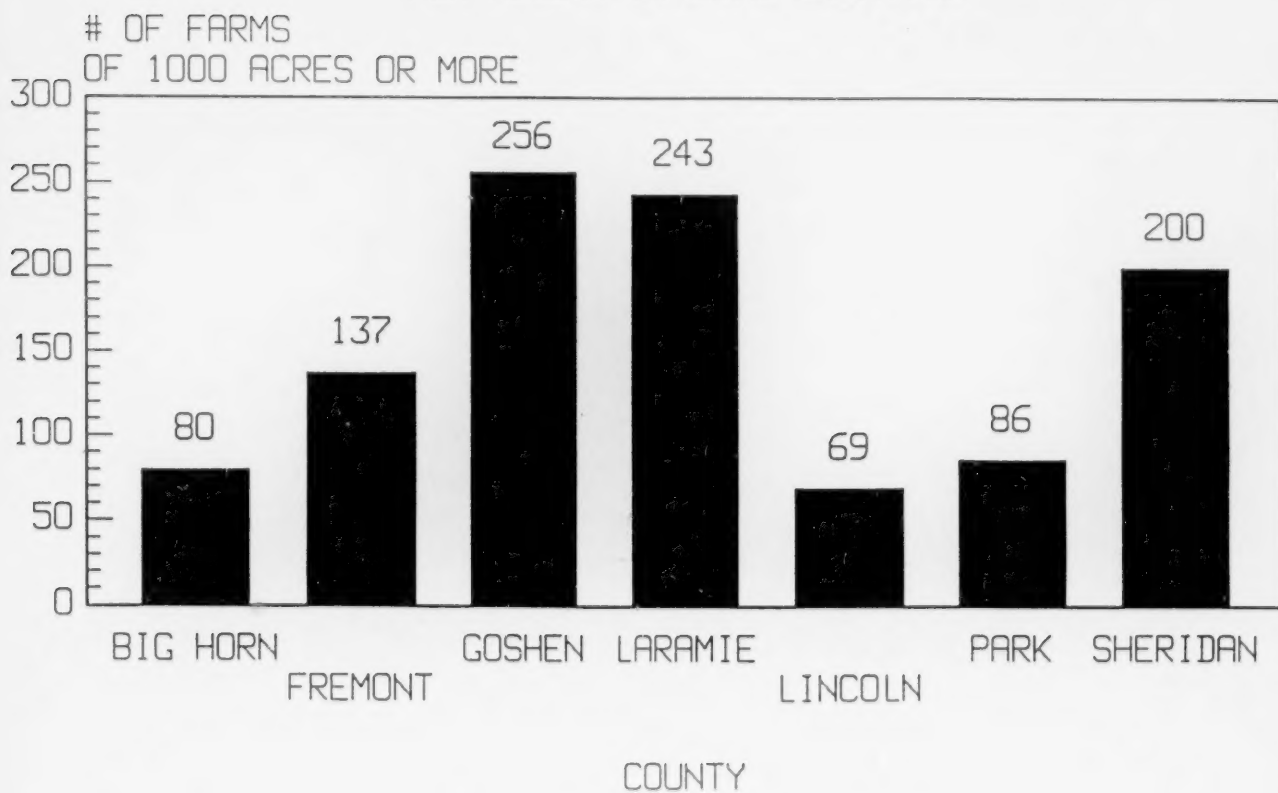


Aside from these geographic areas, Census data will also be available for Congressional districts, voting districts, American Indian reservations, zip code areas, and classified by urban/rural dichotomies. There will also be statistics for Puerto Rico, the Virgin Islands, Guam, Northern Mariana Islands, American Samoa, and Palau. In general, the amount of data published is less for the smaller areas than for the larger.

Terry Haven
Editor
Wyoming Quarterly Update

Feature Articles

NUMBER OF FARMS WITH 1000 OR MORE ACRES
FOR SELECT WYOMING COUNTIES



Blueprint For Business: A Strategic Plan For Wyoming

"Progress means not standing still while others
move forward."

Woodrow Wilson

The business community of Wyoming must provide better private sector leadership. This leadership can and must develop initiatives to make change happen. To do so, the business community must have the cooperation, leadership, and commitment of state and local government, as well as citizens of Wyoming. Without this partnership and a commitment to improvement, Wyoming's economy will continue to stagnate.

How can Wyoming people effect change? Blueprint for Business believes that change begins with three things:

1. Shared concern and positive "can do attitude" regarding the state's economy;
2. Commitment of private sector leadership and resources; and
3. Working partnerships between business, government, environmentalists, and the citizens of Wyoming.

Vision For The Future

Wyoming's people and industry face many choices. This year -- 1990 -- marks Wyoming's centennial year. Wyoming's heritage provides an important basis for its future. The Blueprint for Business Committee believes that Wyoming's future -- ITS VISION FOR THE TWENTY-FIRST CENTURY -- depends on:

- * Progressive wealth, as defined by steady improvement in the economy and an increase in the number of private sector jobs...;
- * Efficient and effective government at the state and local levels...;
- * Continued sense of community...; and
- * A balanced commitment to the quality of Wyoming's physical environment...

Building Blocks For The Future: Job Creation And Steps To Improve Wyoming's Economy

I. Developing Quality Private Sector Jobs

Background

Economic development has been the number one issue in Wyoming for the past five years. It will remain so unless dramatic changes take place. The loss of jobs and people through the mid-1980s and the forecasted growth rate of one percent are alarming. It means that in the year 2000 Wyoming will have still fewer jobs, people, and personal income than it had in 1981-82.

The goal of economic development should be measurable growth in employment and personal income. Successful economic development depends upon an expanding private economy -- not government. Over 80 percent of all new job creation comes from

existing businesses. Accordingly, Wyoming's economy will be helped most by adding value to present products and various business activities. Blueprint believes that Wyoming's future depends on a progressively growing economy.

A. Private Sector Initiatives

Blueprint For Business Recommendations:

1. Equity Capital Fund

The present thrust of most state economic development efforts is the use of low interest loans either to refinance a business or to provide a source of money for new business ventures. Many -- if not most -- of the loan applicants have lacked equity. The result has been too many highly leveraged loans and a general inability to repay the loans due to the imbalance between debt and equity of the businesses. Blueprint for Business thinks it can be successful under the following format:

- * \$15 million raised from the private sector, in minimum units of \$500,000, and committed for a period of up to ten years, and;
- * Establishment of criteria for investment opportunities that provide a net economic benefit to the state.
- * Value-added Potential: 150 jobs per year with an annual payroll of \$2,250,000.

2. Buy Wyoming

Keeping Wyoming money in Wyoming should be a high priority for Wyoming's political leaders, employers, and citizens. It is estimated that the state of Wyoming, local governments, school districts, Wyoming citizens and businesses spend over \$240 million annually outside of Wyoming. Blueprint For Business recommends that:

- * State and local governments, including school districts, be required to adopt a Buy Wyoming First policy and provide to Wyoming businesses lists of purchase items for competitive bidding;
- * Companies doing business in Wyoming, both large and small, as well as citizens, should be encouraged to support Buy Wyoming First policies depending upon the availability and quality of products, prices, and existing purchasing practices;
- * Statewide buying cooperatives to enable smaller Wyoming businesses to better compete against large out-of-state suppliers should be studied;
- * A computer bank be developed for Wyoming manufacturers and products, as well as listing available facilities for business expansions; and
- * Sales taxes be imposed on mail order catalog purchases.

3. Sell Wyoming

Many Wyoming citizens are ambivalent about economic development. They support new jobs and lament the loss of friends and businesses due to recent economic reversals. However, they often resent or fear competition from new businesses entering their local community, mainly because there is only so much money to go around in a state with a low population base and limited market opportunities. With more primary jobs and more people, opposition to new businesses on "Main Street" will lessen. Blueprint for Business recommends that:

- * Local chambers of commerce and business trade associates join hands in developing on-going public relations programs regarding Wyoming;
- * Business leaders actively work with the Governor's Office and state agencies to market Wyoming as a

good place in which to do business and live; and

- * A leadership program teaching entrepreneurial skills be developed to better equip Wyoming business people to market to the nation and the world.

4. Community Improvement and Beautification

First impressions create lasting impressions. The roads leading into towns, downtown areas, and residential neighborhoods make strong statements. In 1984 the Wyoming legislature approved Main Street legislation to support the revitalization and marketing of downtowns in Wyoming communities. Blueprint for Business believes that this state, local government and private business partnership program has been beneficial. Blueprint for Business supports:

- * The Wyoming Main Street program and encourages more Wyoming cities to participate in local beautification and retail marketing programs.

5. Quality and Affordable Health Care

The rising costs of health care, and the health insurance premiums that increase accordingly, must be addressed by the private and public sector. Blueprint for Business is concerned that if costs continue to rise, more people in Wyoming will be unable to pay either their insurance premiums or their medical bills. Dialogue should begin among key interested parties: the hospitals, doctors, employers, trial attorneys, insurance providers, unions, and representatives from state government. Blueprint for Business accordingly recommends that:

- * A model health care delivery system be developed for the state to enhance economic development.

6. Loaned Executive Program

Many people criticize government for being too large and spending excessively. Blueprint for Business believes that before the size of government is questioned, the management of government must be thoroughly reviewed. Blueprint for Business recommends:

- * A Wyoming "loaned executive" program, with the private sector providing business volunteers and the state committing funds to hire a consultant to manage a comprehensive study effort; and

- * An evaluation of state agencies and programs using the "loaned executive" program, with the end product being similar in concept to the recent University of Wyoming management audit study -- a study of excellent scope for which the University, Legislature, and Governor should be commended.

B. Economic Development Opportunities

Blueprint for Business Recommendations:

1. Communications

Communications and associated technologies will be the new highway of the twenty-first century. Telecommunications will be as important to the development of Wyoming's economy and economic initiatives. There is a tremendous need for technological improvements within Wyoming. Blueprint for Business finds that:

- * The Wyoming Public Service Commission should reform regulations to stimulate and encourage the telecommunications industry to invest in the state's infrastructure and provide the services that surrounding

states enjoy; and

- * It is essential to analyze the state's needs, determine what regulations need modification, review regulatory statutes, and then implement an infrastructure to place the state in a competitive position for the short and long term.

2. Agriculture

Agriculture production generates "new" income and is also a renewable source of income. Gross income from the sale of agricultural commodities averaged about \$693 million annually between 1980-1987. More than 8,700 families are directly engaged in agriculture production. Related agriculture economic activity fosters another 17,600 jobs. According to the University of Wyoming, the combined economic impact of all agricultural operations within Wyoming averaged \$1.3 billion annually between 1980-1987.

Blueprint for Business supports:

- * The Department of Agriculture's strategic plan as an effective role model for both planning and cooperation between government and the private sector.

3. Tourism

In 1989 tourism represented a \$1.5 billion industry in Wyoming. It is the state's second largest employer with 29,000 full-time jobs and \$575 million in personal income. The industry accounts for approximately 18 percent of all Wyoming's sales tax collections for state government -- roughly \$14 million per year. Blueprint for Business supports:

- * A Travel Commission program to develop an integrated in-state tourism program -- one that effectively coordinates signage, loop tours,

hospitality programs, and fly/drive vacations;

- * County and city lodging tax efforts to fund tourism programs as a vehicle to increase local interest and support; and

- * Efforts by local communities and the state to continue to promote, coordinate, and use local tax initiatives and state matching loan funds for "western heritage" programs like the Laramie Territorial Prison/theme park.

- * Value-added Potential: An increase in tourism by three percent per year would result in \$24 million more in tourism business receipts per year and increase tourism jobs by 500 annually.

4. Minerals

Mining in Wyoming is a multi-billion dollar industry. Tax revenues for the state, including federal royalty payments, totaled \$694 million in 1989. Personal income was \$810 million for the 25,000 employed in Wyoming's various mining industries. Pay scales for the industry are higher than most other jobs; every mining job on average creates three additional service jobs. Blueprint believes that Wyoming's mining sector is the backbone of Wyoming's economy. Given its economic importance, Blueprint believes that:

- * Taxes on the minerals should be competitive and predictable, with rule making by state agencies in clear accordance with legislative intent;

- * The state should work closely with mining companies to enhance the development of new technologies and the exploration in new resource fields.

5. Pipeline Projects

The Wyoming to California natural gas pipeline project should become a reality for Wyoming -- if not soon, within the near future. The proposed project will create jobs and added tax revenues at a time when the state's budget is stretched by competing demands. Blueprint for Business Recommends:

- * Studying marketplace conditions and the economic potential of developing CO₂ pipelines to major oil fields throughout the state in order to make enhanced oil production economical, maintain current oil and gas production and employment, and continue economic benefits to local communities.

6. Mineral Processing

Processing minerals produced in Wyoming can add significant jobs to the state. Recent developments in the trona industry substantiate this. Wyoming possesses the largest reserves of natural trona in the world. Development of this resource is dependent on the state's business climate and domestic and world markets. With tax predictability assured, investment decisions can be made for plant expansion and further job creation. The Blueprint for Business Committee believes that Wyoming should:

- * Take note of not just trona, but all mineral industry sector needs that can lead to increased jobs as a result of value-added processing; and
- * Pursue the development of additional business opportunities associated with vertical integration, such as the servicing of rail cars that transport trona and the manufacture of steel mine support shafts for the mines.

7. Environmental Quality

Preserving Wyoming's clean air and water, wildlife populations, and scenic beauty is an essential part of the strategies to build the state's economy. Many people have come to Wyoming and sought jobs here because of the state's outdoor recreational activities. Wyoming has done an effective job in maintaining its natural environment. It can continue in the future and yet still accommodate additional resource development in basic industries and new economic diversification efforts. It recommends:

- * Continued attention to the values inherent in a quality environment; and
- * Improvement in access to fishing, hunting, hiking and camping on state and especially federal lands, which to a certain extent have had a decline in use due to wilderness designations.

8. Recycling And Solid Waste Management

Solid waste management represents an extraordinary business opportunity. New solid waste management ventures require sound and objective research. New technologies can guarantee environmental safeguards -- safeguards that can provide economic advantages to the state. Given the extensive level of transportation of Wyoming's coal to more populated regions of the country, there may be a way to couple increased production and movement of more coal with the return of environmentally secure, baled solid waste to the state in empty coal cars. Blueprint for Business recommends:

- * An in-depth economic feasibility study regarding the transportation of environmentally secure and sanitized solid waste back to Wyoming in empty coal cars for deposit in abandoned mine areas or for recycling programs to supply raw materials for the

manufacture of new products;

- * The development of prudent environmental standards, monitoring procedures, and licensing requirements to assure environmental quality; and

- * Value-added Potential: Coal production/solid waste program could increase coal production by 10 million tons, create 508 new jobs, and add \$20 million in payroll and \$30 million in new tax revenue from coal severance, mineral royalty, ad valorem taxes, and the placement fee for the solid waste.

9. Transportation

a. Highways

With its great expanses, Wyoming is a state that depends on its highways to move people, raw products, goods, and services. Continued and expanded use of highways is important. Blueprint for Business recommends:

- * The development of a 15 year implementation plan to construct additional four lane roads in Wyoming;

- * Dedicated funding of a three cent per gallon gas tax to facilitate new construction; and

- * Bicycle paths beside highways in Wyoming's national forests and through recreation areas in cities and towns.

b. Air Travel

Wyoming has underutilized airports, personnel, and equipment. Suitable air transportation is necessary for the development of jobs. Blueprint for Business recommends:

- * The state, through the State Aeronautics Commission or the Department of Transportation, look at

ways to enhance air service to and from Wyoming as well as between Wyoming cities.

c. Rail

The importance of rail service lies mainly with commercial freight through Wyoming and the movement of products like coal and soda ash (trona) that are mined in Wyoming. Blueprint for Business recognizes the importance of rail service to local economic development. Blueprint also believes that Wyoming should pursue renewed Amtrak service.

10. Water

Blueprint for Business fully recognizes the complexities associated with water and its use. Fluctuations in water supply from year to year create problems in all areas of the state. Blueprint for Business believes that the quantity and quality of Wyoming's water must be aggressively managed and protected to assure maximum benefit for future generations. Blueprint for Business therefore recommends that:

- * The obstacles and problems created by federal regulations and interstate compacts must all be addressed, and wherever possible, resolved along with the determination of both the technical and the economic feasibility of each potential project;

- * The private sector should be encouraged to participate in Wyoming water development wherever possible; and

- * Since Wyoming's constitution clearly establishes state primacy on water resources, and federal intrusion into this area, which is apparent on many fronts, should be resisted.

11. University of Wyoming

Lasting economic diversification and maintenance of a strong economy depends on education. The University of Wyoming is and should be at the forefront of education and applied research. Blueprint for Business believes that the University of Wyoming is one of Wyoming's keys to technology and change. It recommends:

- * Ten endowed chairs at the University of Wyoming.
- * The initial development of ten fields of study that are nationally recognized for excellence; and
- * University leadership in new opportunity areas, with special focus on business management, environmental research, education, science and technology, natural resources, water, mining and minerals, and tourism.

12. Retirement Community

Wyoming's climate is very good by comparison to states in the Northeast or upper Midwest. Wyoming has very favorable personal income and inheritance tax laws that conceivably could stimulate retiring to Wyoming.

Blueprint for Business recommends that:

- * The Economic Development and Stabilization Board develop strategies for retirement living in Wyoming.

II. Rigorous Research and Analysis

Background

Wyoming lacks reliable and readily available data regarding its economy. Economic analysis of various project ideas

relates to the progressive improvement in Wyoming's economy. Blueprint for Business believes that additional planning and cost/benefit analysis is necessary before the state commits itself to fund new, or continues support for, present economic initiatives.

Blueprint for Business Recommendations:

1. Economic Data and Information

Business and government need timely and objective information for research and decision making. Blueprint for Business recommends:

- * The collection of business statistics and economic outlook information, with the gathering and analysis centralized at either the University of Wyoming or state government in Cheyenne in the Department of Commerce where an independent Bureau of Business Statistics and Economic Analysis would be established.

2. Analysis Of State Economic Development Initiatives

For state taxpayer funded economic development programs, Blueprint for Business Committee recommends:

- * Preliminary and objective analysis by professional consultants to determine the feasibility for projects requiring the use of state funds, with such research focusing on legal, environmental, technical, political, financial, and management conditions before legislation is passed;
- * In-depth economic research and analysis (assuming a green light is given to the initial review) by professional and qualified consultants.

III. State Loan Programs and Tax Incentives

Background

Wyoming must be careful in thinking that it can buy its way into prosperity with grant and loan programs. Differences exist between various "loan programs" and other state programs that offer incentives to businesses versus businesses that spend their own money for expansion. Blueprint for Business believes that stable tax policy and regulatory assistance are just as important as low interest loan programs. Determination must be sought as to whether using the Severance Trust Fund or non-earmarked General Fund monies has helped Wyoming's economy. Blueprint for Business believes that state loan and tax incentives, given limited financial resources and other state priorities, should be based on:

- * Analysis of the various loan and subsidy program approaches that exist throughout the country to see how Wyoming should best use its loan money, recognizing that Wyoming is a "late comer" to the economic development arena;
- * Objective review and analysis of the net economic benefits of all state loan subsidy programs, with curtailment or suspension of non-beneficial programs;
- * A reassessment of the Wyoming Permanent Minerals Trust Fund and the extent to which it should be used, if at all, to finance loan programs; and
- * Reviews of other state revenue sources, including the use of the General Fund monies to finance the more risky programs.

Blueprint for Business Recommendations:

1. State Loan Program

Wyoming's Permanent Mineral Trust Fund and the General Fund, by legislative action, have been used for a variety of loan programs. By statute, approximately one billion has been allotted, even though it was never intended that all of the trust fund be a total loan program. Blueprint for Business believes the purpose of the Trust Fund is to provide a source of income for the state, provided that the corpus of the fund remains intact. It should not be used as a subsidy program resulting in a net loss of revenue for the state. Higher standards for some loan programs are needed. Blueprint for Business recommends:

- * Enhancement of the development of natural assets. For example, the Wyoming to California natural gas pipeline for expanded natural gas production or the construction of a CO₂ pipeline within the state for enhanced oil recovery will provide a return of additional severance tax dollars, due to increased production, to the Permanent Mineral Trust Fund;
- * Diversification of state's economy, either through vertical integration/downstream processing such as the Chevron fertilizer plant in Rock Springs, the Church and Dwight plant in Green River, the proposed petrochemical facility in Evanston, a specialized agricultural processing facility, or the creation of totally new business opportunities such as telemarketing or insurance, based on a net economic return to the state from ad valorem and sales tax revenues from the businesses themselves and the people they employ; and
- * Use of the private sector leadership to direct and manage taxpayer-funded programs based on sound business

principles -- as opposed to state or local government employees who lack management skills, follow-up procedures, and personal financial risk.

2. Tax Incentives

Tax incentives for long-lasting natural asset or diversified business projects may offer an alternative to use of the low interest state loans. Specific programs for existing or new businesses, based on cost benefit analysis of tax revenue, job creation effects, untapped infrastructure capacity, and assurances that the recipients of these programs stay in Wyoming could include:

- * Review of wildcat and tertiary recovery projects as to positive effects of this previous incentive legislation;
- * Reduced or suspended ad valorem taxes on equipment or business improvements when related to expansion in, or relocation to, Wyoming for a five to ten year period; and/or
- * Reduced or suspended severance taxes on new mineral production for a five to ten year period.

IV. Efficient Government and Sound Tax Policies

Background

For the past six years, the Wyoming Legislature and Executive Branch have struggled with the state's budget. Reserve accounts have been exhausted and fund diversions have been instituted to pay for state programs. There are three areas of concern about present and future government in Wyoming; government efficiency, the state's budget, and Wyoming's tax base. There is no

question that the essential role of government is the provision of public services. In order to continue to provide good governmental services, Wyoming must expand its economy, make government efficient, or as a last resort raise taxes.

Blueprint for Business Recommendations:

1. Government Efficiency And Reorganization

In 1988, the Legislature approved a state government efficiency study to look at the maze of government agencies in Wyoming. Given the importance of accountability, management control, efficiency, and overall governmental coordination, the Blueprint for Business believes that reorganization should proceed based on the general recommendations and study efforts of the Joint Legislative/Executive Efficiency Study Committee. It should:

- * Include all state agencies, since individual agency goals and agendas could work against the development of state plans and undermine the ability of the Governor to decisively set policy for the state; and
- * Result in state government agencies being clearly accountable to the Governor and Legislature.

With respect to the question of local government, Blueprint for Business recognizes the value of consolidating local governmental services. Current state law prohibits the consolidation of cities and counties. Blueprint for Business recommends:

- * Enabling legislation to change the state's constitution so that cities and counties may organize and consolidate for more effective and cost efficient operations.

2. State Budget

In recent years, normal revenues for the General Fund have lagged behind expenditures, with "rainy day accounts" and revenue diversions being used to provide for a "balanced" General Fund. Given the financial condition of Wyoming's overall economy, it is essential to have more accountability. Blueprint for Business recommends:

- * A thorough review of earmarked revenues to determine the appropriateness of "de-earmarking" some state revenues so the Legislature and executive branch can set priorities and evaluate programs based on the total money available;
- * Providing the Governor with more flexibility, in accordance with state reorganization, to shift state employees to meet changing priorities or program mandates; and
- * Downsizing state government, consolidating local government, and keeping government expenditures more in line with the regional averages.

3. Broadening the Tax Base

Wyoming's tax base for state and local governmental services presently relies all too heavily on mineral taxes. Wyoming's individual citizens have a bargain in terms of how little they pay for the government services they receive. The tax burdens in Wyoming for individuals, and most businesses, is one of the lowest in the country. Yet services in Wyoming, and per capita government spending, are among the highest. Blueprint for Business recommends:

- * Cities be allowed, via a public referendum, to increase the present sales tax from three percent to a

maximum of six percent in order to finance local government programs;

- * A change in the state's constitution regarding mandatory mill levy rates for residential and commercial property in cities, counties, and school districts to allow those entities, via a public referendum, to set for themselves mill levy rates to not more than double current maximum rates; and

- * Some state sales tax exemptions that exist for private businesses could be eliminated in order to generate an additional \$15 million annually in state revenue.

V. Quality Education Without Exception

Background

Quality education is essential to Wyoming's future economy and total well-being. Blueprint believes that Wyoming should strive to be a state where education at all levels -- K-12, community colleges, and the University of Wyoming -- is known throughout the country for excellence.

Blueprint for Business Recommendations:

1. Excellence

Wyoming should become one of America's education states, where the University of Wyoming, community colleges, and primary and secondary schools are recognized without exception as being quality institutions. Areas of excellence might include:

- * Required core curriculum including achievement standards for math, science, English, foreign languages, social studies, and computer sciences for all students attending Wyoming's secondary schools;

- * Mastery of essential skills for all students in order that they may better function in society upon graduation; and
- * Minimum entrance requirements, or conditional admission procedures, for students wanting to attend the University of Wyoming.

2. Innovation

Blueprint for Business believes that expectations of society demand innovation. Innovative programs in schools could focus on:

- * Limited alternative certification programs for teaching at all levels -- K-12, community colleges, and the University -- in order that new ideas and work experiences can be shared with students;
- * Reviewing a school program and developing an innovative program "from scratch" based on the needs of today's students, the demands of a global economy, and incorporating today's technology by involving the private sector with government and educators;
- * Establishment of ten university chairs to be funded by an endowment raised by state government, the business community, and the public, with an initial goal being ten nationally recognized fields of study at the University; and
- * Increased participation by the business community on local boards and committees, as well as in the classroom where appropriate.

3. Accountability

Accountability must be an essential part of improving education. Blueprint for Business would consider the following as

subjects worth examining:

- * Audits of the Department of Education and community colleges like the one completed at the University of Wyoming;
- * Average test scores in the top 25 percent for every Wyoming school district for national educational aptitude and achievement tests administered to Wyoming's K-12 students;
- * Requirement that every Wyoming high school graduate be computer literate by 1995; and
- * "Report cards" on schools and communities based on set measurement standards that are given to parents, the community, and the Legislature relating to not only the performance of the students, but the performance of the schools students attend.

4. Funding

The state must continue to provide funding for quality education spending while assessing what it receives for its dollars. Some funding areas to recognize include:

- * Continue to provide quality education funding;
- * Provide funding for innovative educational programs at all levels of the educational spectrum; and
- * Establishment of a realistic merit pay system that rewards teachers who achieve exceptional standards in teaching.

VI. "Business Friendly" Regulations

Background

Wyoming as a state leads the way in services for its citizens and safeguards for the environment. Blueprint for Business is

concerned about the relationships that exist between those who regulate and those who are regulated.

Blueprint for Business Recommendations:

Wyoming should create and have a nationally recognized "business-friendly environment". A positive regulatory climate could do as much for new job creation as present economic development loan programs. Blueprint for Business believes that resources in state government currently exist to make this happen. The Blueprint for Business Committee recommends:

- * Preparation of Environmental Impact Statements by the state, before regulations are enacted, for state regulations that are tougher than those used by the federal agencies or other states;
- * Involvement of business, the University, and regulatory agencies in joint studies regarding the best and most practical approaches to develop effective regulations for new laws and new industries;
- * A program organized by trade associations representing key industries in the state whereby managers/employees of the state's regulatory agencies take "on-site" visits to some of the businesses they regulate to be briefed and provided background on their activities;
- * An ombudsman in the Governor's Office, as well as "traveling referees" to minimize and work out disputes and assure either streamlining the permitting process or a one-stop service for potential new and existing businesses in the regulatory permitting process; and
- * Regularly surveying businesses subjected to regulation to determine

whether or not Wyoming is a "business-friendly" state.

VII. Wyoming's Federal Land Resources

Background

The state of Wyoming effectively manages only 50 percent of its land base. The remaining 50 percent of Wyoming's land surface is owned and managed by the federal government, primarily the BLM and the Forest Service. These federal lands account for tremendous economic activity, including: 52 percent of all coal production; 58 percent of all crude oil and 35 percent of all natural gas production; 9 percent of all grazing; 80 percent of the state's tourism; and 90 percent of all timbering.

Wyoming needs to take positive steps to promote the prudent development of its timber, oil and gas, mineral, tourism, and agriculture resources. Withdrawal of federal lands, in a state like Wyoming, will ultimately strangle the state's economy.

Blueprint for Business Recommendations:

Blueprint for Business Committee is convinced that the current federal land management process is counterproductive. Open-ended assertions and too many "what ifs" stretch scientific reality. The issue of federal land management is more than a state problem. It is a national issue as well. Wyoming, like other states, it is caught in the middle.

Blueprint for Business recommends:

- * The state of Wyoming earnestly and more forcefully monitor and research the economic, social, and environmental impacts of federal land decisions in order to effectively

represent and protect Wyoming's interests; and

* The Legislature establish a procedure to evaluate the impact of federal land management decisions on state economic development projects and goals.

Conclusion

Wyoming has a quality of life, a populace, and a natural resource base that has few equals. The Blueprint for Business Committee believes Wyoming's centennial year should mark a new beginning. Every Wyoming citizen must dedicate himself to working for Wyoming and the unique assets that exist in Wyoming.

The centennial year offers a clear choice to create a new beginning for Wyoming. Do we "hang on" and continue to act as though we can't solve our problems. . or do we band together to improve our state's economy? A new Wyoming is possible in the next decade and 100 years -- but it will require a commitment to change, or else Wyoming will go backward while others are moving forward.

Blueprint for Business believes that to accomplish its vision, Wyoming must invest in itself. Wyoming citizens need a positive attitude -- and a sense of pride in Wyoming's values and strengths. Wyoming's institutions - government, education, the media, civic

groups, and employers -- need to be positive about Wyoming, discuss the good things we have, and support new ideas and programs that improve our economy. Wyoming people must want and commit to economic development if the economy is to improve.

This Blueprint for Business Report outlines some strategic opportunities for Wyoming -- areas where Wyoming can make a difference and have a competitive edge. Blueprint for Business believes the next step is public support of these ideas, additional strategies, and implementation of them.

Many of the ideas in the Blueprint for Business Report are not new. Blueprint believes that Wyoming must strive to achieve a growth rate of two and one half to three percent. With progressive, yet moderate, growth, Wyoming can become a state of opportunity. The time is now for Wyoming citizens to band together to better take control of their destiny.

Blueprint For Business Committee
Sponsored by the Wyoming Heritage
Foundation

(Editor's note: This article is an overview of the Blueprint not the entire document. The next two articles are comments on the entire Blueprint.)

Comments On Blueprint For Business

These comments on the Blueprint for Business should not be construed as a criticism of the Committee or Heritage Society Director Bill Schilling. The Blueprint process and the discussion it has engendered are positive steps in the evolution of Wyoming. The Blueprint's call for greater private sector participation in developing Wyoming's economy should not go unheeded.

This is not a minority report to the Blueprint. As in all committee efforts, individual members have disagreements with parts of the report and/or the way certain ideas were treated or omitted. The Blueprint is an advocacy piece developed with a specialized viewpoint as to what Wyoming's future should be. The Blueprint does not represent a consensus of the committee members; woman, labor, local governments and education had less than equal representation on the committee. This is evident throughout the document. Although it could be argued that this document should only represent the business perspective, if consensus is a goal these other groups should be included in future discussions.

Whether one agrees or disagrees with the perspective on particular subjects, the Blueprint constitutes a definition of several important issues facing Wyoming. The difficulties encountered by the Committee and those in the Blueprint simply reflect the difficulties inherent in formulating policy in Wyoming.

1. The report is entitled a "Blueprint for Business" but actually has more to do with government. Nearly all of the

recommendations involve actions to be taken by governmental entities at one level or another. A notable exception to this general statement is the recommendation that private companies sponsor a venture capital fund for Wyoming. The report is a curious blend of government criticism combined with calls for greater government action in everything from health care to developing business skills. The Blueprint for Business calls for very little activity by the private sector. For instance the Buy Wyoming section has a strict recommendation for government purchases while the private sector is freed from such an obligation depending on price, quality, and existing company purchase practices. Little attention is given to the role of the banking industry, the various trade groups and associations, or the mainstreet businesses, in making the Blueprint a reality. Under the Blueprint, government is the preferred agent for making our dreams come true. Many of the recommendations for government action are only correct, if the private sector is a true partner. At a minimum it makes sense to bring into the discussion initiatives for the private sector to pursue. There are likely many activities that an enterprising private sector could do independent of governmental action to move development forward. Focus on these possibilities would strengthen the Blueprint.

2. The Blueprint, like the architect's conceptual drawings for the couple planning to build a new home, is unrestrained as to the ultimate cost of constructing the world of the Blueprint. The intellectual rigor and financial accountability step remains a significant hurdle for the Blueprint process. Our committee did

not tackle the difficult task of refining the wish list into a set of priority activities and projected expenditures of time and money by the public and private sector. Every successful company, large or small, is forced to set priorities, make decisions, and manage its resources. Transferring this practice to the development process for Wyoming could be an important private sector contribution to Wyoming.

The Blueprint envisions aggressive programs in education and economic development along with tax incentives for the mineral industry and regulatory reform for the utilities. All of these proposals carry potential costs and benefits for consumers, individual taxpayers, or industry. The Blueprint attempts to quantify some of the benefits but the costs of the proposals are not given equal treatment. The federal deficit is testimony to the failure to properly account for the benefits and costs of combining tax cuts and increased government expenditures.

The Blueprint sets forth a veritable buffet of options. Understanding which options to pursue, if any, cannot be done without a comparative assessment of the costs and benefits of the options. Even a macro-level composite budget would begin to bring priorities into focus for a robust discussion of the tradeoffs. It simply does not make much sense to proceed without a first-cut Blueprint for Business budget.

3. The Blueprint reflects the internal inconsistencies inherent in blending public policy advocacy with public policy analysis. Because the sponsoring entity has a public policy agenda, the principles articulated in the report are not always evenly applied. Several examples will illustrate the point. The Blueprint is critical of earmarking state funds for a particular use but supports "dedicated

funding of a three cent per gallon gas tax" for road construction and earmarked lodging taxes to support tourism. The Blueprint calls for critical review of state loan subsidies but concludes that the proposed pipeline loan (the largest loan ever considered by the State) is both worthwhile and necessary. The positions taken by the report are not necessarily incorrect but the broad principles used to support some recommendations are at odds with other recommendations.

4. Some of the recommendations in the Blueprint for Business reflect the limited time available to the committee to understand the status of certain activities or the factual basis for the recommendations. For instance the Blueprint calls for a feasibility study of transporting waste to Wyoming coal mines. The Campbell County Commissioners are undertaking such a study by way of a Planning grant from the Economic Development and Stabilization Board. The Blueprint is critical of the failure to implement all of the industry task force recommendations on regulatory reform. The Committee had never formally reviewed the recommendations nor the progress made in implementing the recommendations. Furthermore, implementation of all of the recommendations simply was not feasible.

The press to formalize a draft Blueprint to stimulate the statewide discussion may have produced recommendations that are not entirely fair or accurate. Fortunately, the document is intended as a draft. It should serve as a basis for discussion and not necessarily as an exact map for the future.

5. The Blueprint is generally strong in its background sections and identification of issues. The recommendations are not equally thoughtful. The most valuable recommendation and the one most generally

ignored by those of us on the committee is Recommendation Number II which calls for rigorous research and analysis of existing and proposed state initiatives. This suggestion that "we look before we leap" should be applied to the Blueprint recommendations for state and private action.

Conclusion

The difficulty with formulating a plan for Wyoming is that any number of recommendations seem extremely valid to the people who operate in a particular field of endeavor. The question of whether those same recommendations make sense in the context of an overall Blueprint for Wyoming is considerably more complex. It is this second question that the Heritage Society is asking the citizens of Wyoming to address by labelling the document a "Discussion Draft".

The editors of this Publication asked for a critique of the Blueprint for Business, we have attempted to fulfill that assignment.

The Wyoming Heritage Foundation deserves considerable credit for devoting the time and resources to development of the Blueprint document. It can be an important process for the discussion and evaluation of a wide range of ideas.

Dave Freudenthal
Attorney at Law

Rob Hurless
Editor, Casper Star Tribune

(Editor's Note: Dave Freudenthal and Rob Hurless are Executive Committee members on the Blueprint for Business)

A Conservationist's Review of the 1990 Blueprint For Business

In June of 1990, the Wyoming Heritage Foundation of Casper, Wyoming released a draft report entitled Blueprint for Business: A Strategic Plan for Wyoming. The premise of this report lies in the assumption that "without change and meaningful improvement, Wyoming faces the real possibility of becoming a state lacking economic opportunity for its people and commerce". (Blueprint at 3). While it would be difficult to argue that Wyoming has an increasingly dynamic economy, it is important to point out that in its centennial year the economic outlook for the state is far from bleak. Of greater importance to those concerned with Wyoming's environment is the Blueprint's preoccupation with maintaining development activities which are injurious to soil, air, water and wildlife resources.

The Blueprint views the energy "boom" years of the early 1980's as the water mark for Wyoming's economic health. The "boom" was a time of high personal and community economic reward, but it also brought an expanded transient population accompanied by increased demands on community infrastructure, social services, and environmental quality. While the Blueprint makes good points on the need to better develop communications, transportation systems, education, private sector initiatives and loan programs, the fundamental premise of "growth for growth's sake" is fatally flawed.

The Blueprint recognizes that Wyoming's low population creates a greater sense of "community" and provides the state with advantages over more densely populated areas of the country. The Blueprint fails to

note, however, that Wyoming's low population in combination with the existing economy has made for a fairly high per capita standing. With a 1987 population of about 450,000 and a statewide total personal income of roughly \$6231 billion, the per capita income was over \$13,700.00. By comparison, the per capita income for California in 1987 was \$13,197.00 (not including non-cash and social benefit income). The Gross State Product for Wyoming was \$8.172 billion in 1987, down from \$9.822 billion at the height of the "boom" but still a hefty figure. These numbers do not include the billions of surplus dollars that are banked in various state trust accounts. The "bottom line" here is that the Blueprint argues heavily for increased environmental impacts from increased commodity production and decreased regulation on the basis of pessimistic economic projections which are essentially subjective.

Specific threats to Wyoming's environment can be assessed by evaluating the emphasis the Blueprint places on the means to achieve economic development goals. The heavy influence of commodity production interests who made up the Blueprint's committee is also easily assessed by the persistent pursuit of existing income sources and the lack of any new vision towards truly diversifying and sustaining Wyoming's economy.

For example, mineral development is termed "the backbone of Wyoming's economy". (Blueprint at 10). Given the likelihood of Wyoming's trona, bentonite, coal, and natural gas resources, mineral

development will play a large role in the state's economy for decades to come. There is no need, as the Blueprint asserts, for the state to reduce severance taxes or weaken environmental regulation in order to make Wyoming's minerals more competitive. As long as the market exists, the demand for minerals will persist without the need to either abuse the environment or deplete state trust accounts. In fact, the increasing demand for these mineral resources should be accompanied by increased environmental safeguards and severance provisions in the interest of Wyoming's future.

The Blueprint believes that "Wyoming has done an effective job in maintaining its natural environment". (Blueprint at 11). The Blueprint's framers have little regard to the significant impacts of livestock grazing and timbering in furthering the decertification of Wyoming, or the contamination of surface waters and ground waters from non-point source agricultural pollution and energy development, or the degradation of airsheds from increased releases of stack emissions and fugitive dust. The loss of riparian areas and wetlands, key components of a functional ecology, has not been abated in the least. Wyoming's forested lands continue to have habitat fragmented and divided through development activities, and its rangelands continue to suffer from chronic overgrazing and the political manipulation of range managers. Oil and gas development continues to intrude upon the most fragile and sensitive environments in the state, as exemplified by the current effort to locate a well in a glacial cirque atop 11,000 foot Carter Mountain by Exxon. Wildlife interests are engaged in a pitched battle with the coal mining industry over whether coal mines should even look at impacts to wildlife or provide adequate vegetation to support wildlife on reclaimed land. It is not surprising that those who profit from lax environmental regulation support the Blueprint's assertions, or that

wilderness designation is considered by them to have lowered the quality of Wyoming's environment.

The Blueprint continues its attack on the environment by supporting the importation of the nation's garbage (page 12), the removal of federal regulations impeding wasteful water development projects (page 13), the reorganization of state government so as to remove the independence of the Game and Fish Department (page 20) and the control of the management of federal lands to augment commodity production (page 28). The Blueprint also supports the "Strategic Plan for Wyoming's Agriculture Industry". (Blueprint at page 9). The "Strategic Plan" continues the callous approach of the Blueprint by asserting that livestock grazing on public lands should have no net loss (regardless of impacts to wildlife and the environment) and actually supporting expanding grazing on public lands. The "Strategic Plan" also supports increased water development and no net loss of irrigated land, again at the expense of the environment.

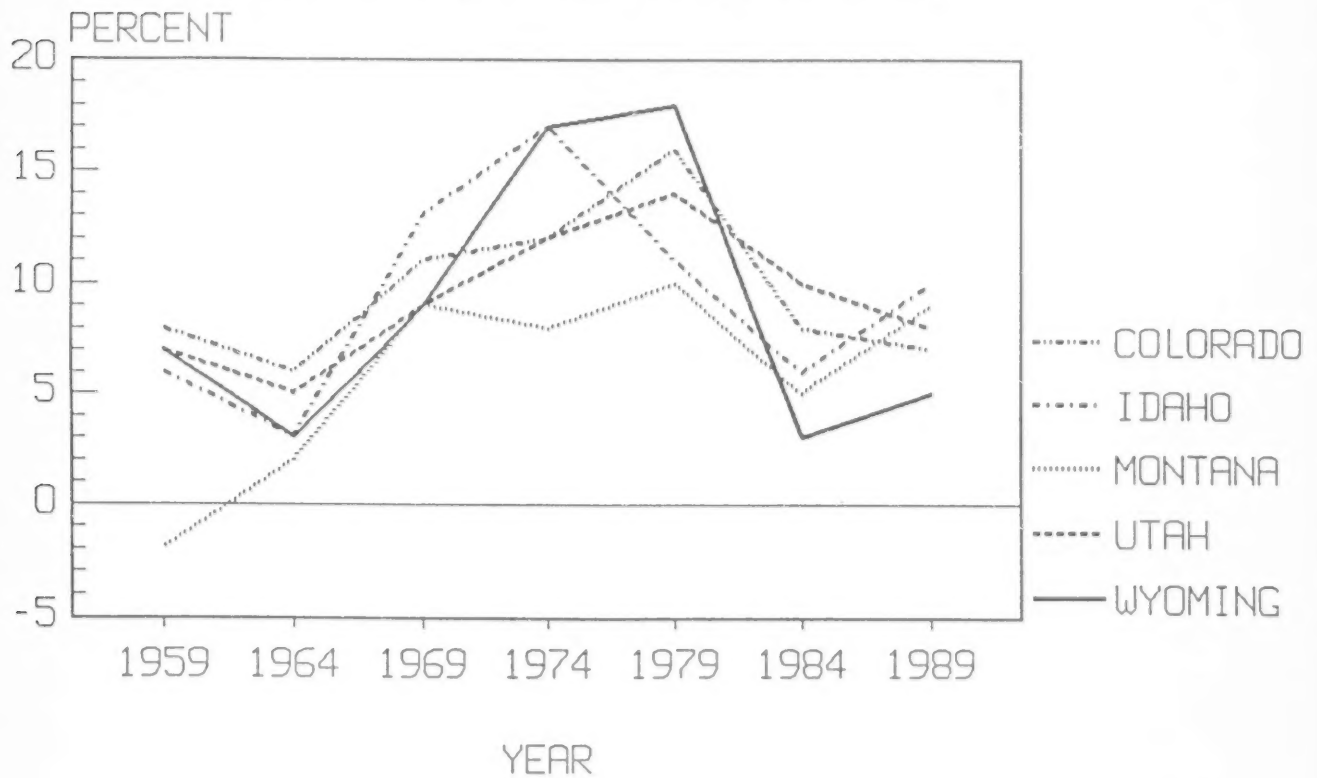
Conclusion

The Blueprint for Business, while purporting to provide a framework for future economic development, instead merely acts to defend existing practices without offering any substantial vision of alternatives. Given the current impacts to Wyoming's environment from existing uses, the Blueprint cannot be viewed as anything more than environmentally-negative. It would be inappropriate to consider the Blueprint as a rational and sensible approach to paving the future of Wyoming's economy as such.

John Zelazny
Conservation Programs Director
Wyoming Wildlife Federation

FYI

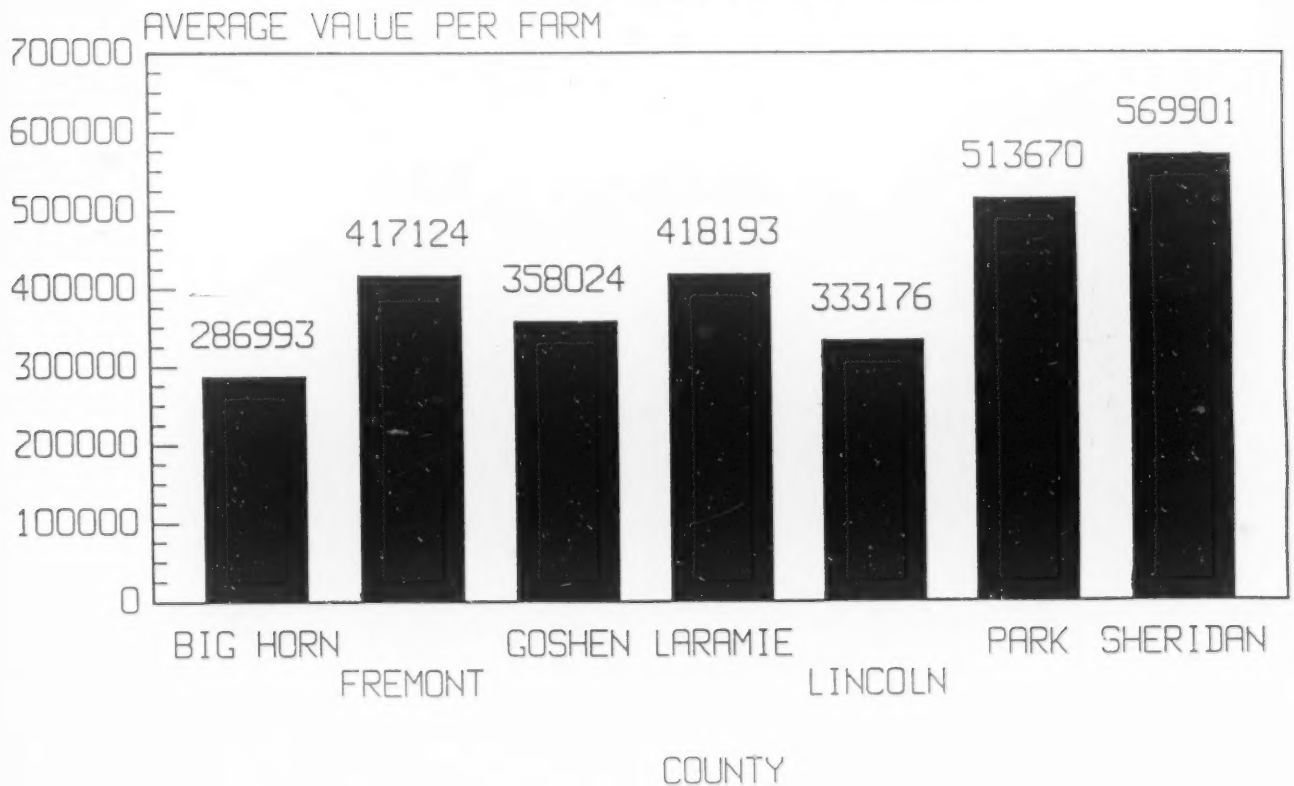
CHANGE IN PERSONAL INCOME (PERCENT CHANGE FROM PREVIOUS YEAR)



Source: Bureau of Economic Analysis

Economic Changes

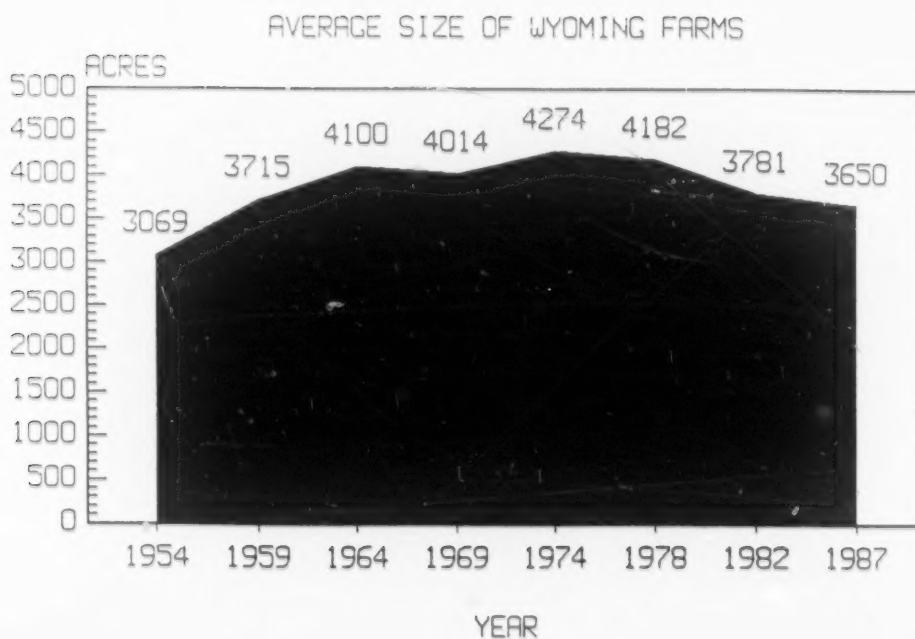
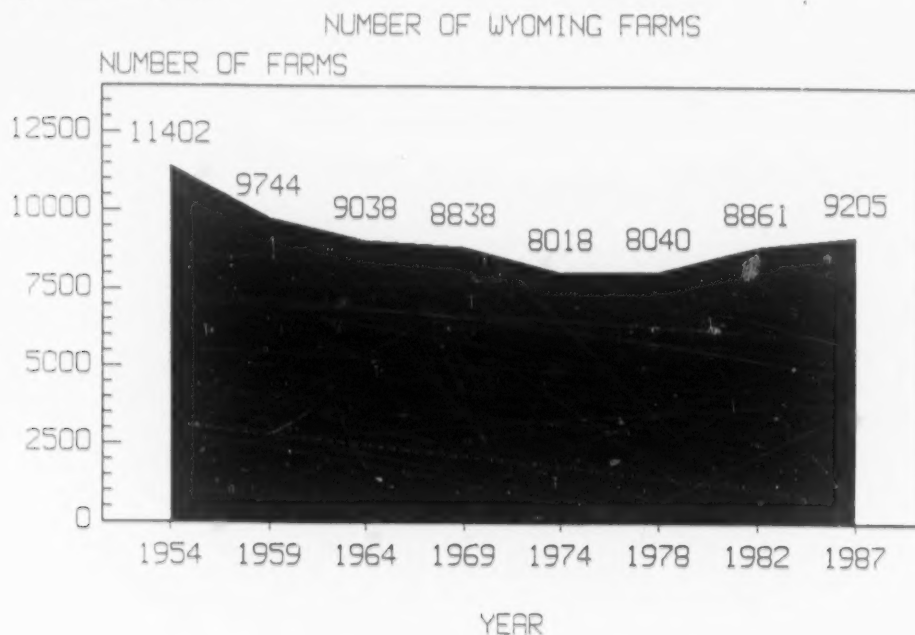
AVERAGE VALUE OF LAND AND BUILDINGS
FOR SELECT WYOMING COUNTIES



ECONOMIC CHANGES

The U. S. Census Bureau recently released its 1987 Census of Agriculture. This survey is now conducted every five years in years ending in 2 and 7. The graphs below show the inverse relationship between number of farms (farms include ranches) and the average size of farms in Wyoming. In general, as the number of farms increase, the average size decreases.

The Census of Agriculture also reported that in 1987 the average value of land and buildings on Wyoming's farms was \$533,284. There was 2,838,627 acres of cropland on these farms, 1,717,027 of which were harvested. Of the 9205 farms 5953 of their operators considered farming their principal occupation, and the average age of operators was 52. Almost 80% (79.1%) of the farms were owned by an individual or families.



State Data

AVERAGE TOTAL SALES PER FARM
FOR SELECT WYOMING COUNTIES

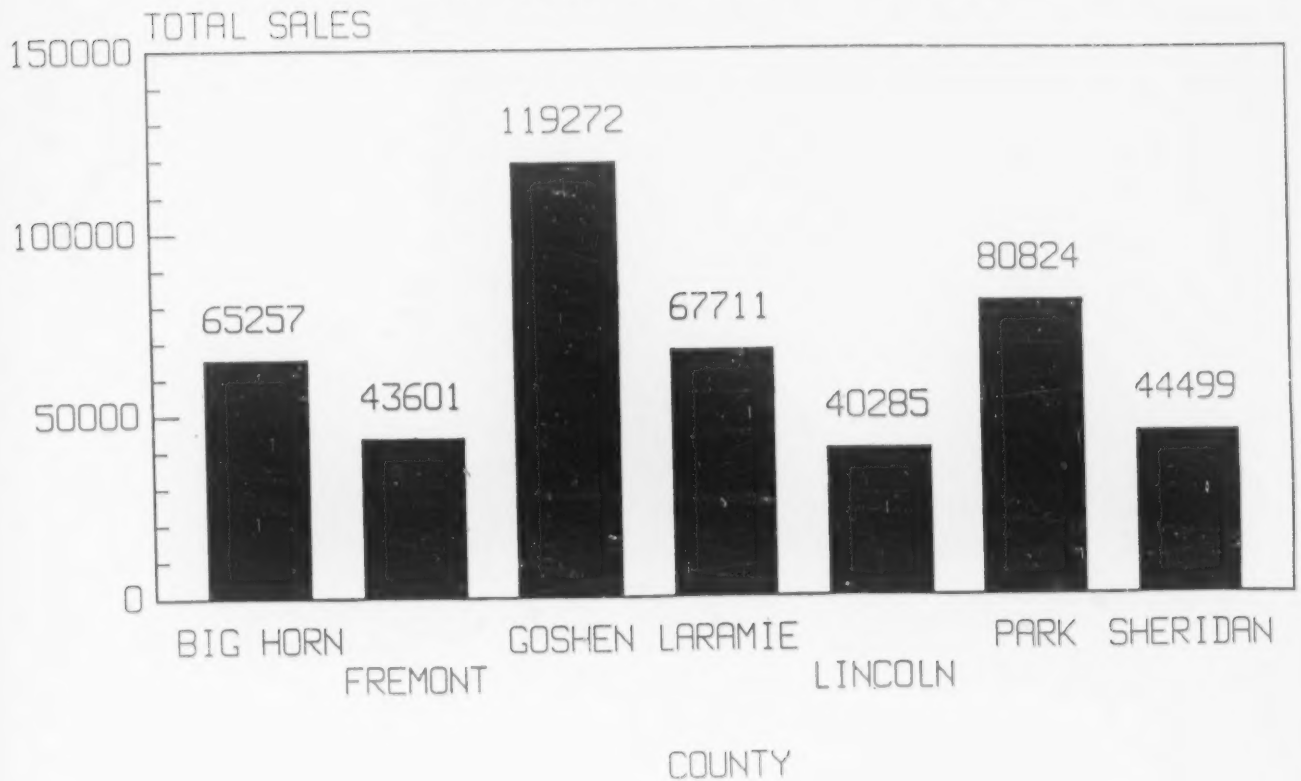


Table 1: Agriculture¹

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Timber Cut in Wyoming National Forests (MBF)	20299.	75482.	28080.	5860.	39416.	54863.	23488.	6218.	37522.	46222.	26418.	65442.
Price Indices ² (1967=100)												
2. Wyoming Crops, Prices Received-Latest	220.	218.	218.	244.	323.	322.	349.	363.	307.	323.	337.	347.
3. Wyoming Crops, Prices Received-Average	230.	218.	217.	234.	302.	323.	344.	362.	327.	317.	327.	346.
4. U.S. Crops, Prices Received-Latest	266.	216.	212.	249.	260.	262.	266.	275.	244.	241.	258.	301.
5. U.S. Crops, Prices Received-Average	223.	217.	214.	230.	262.	260.	264.	273.	250.	245.	263.	271.
6. Wyoming, All Commodities, Prices Received-Latest	304.	268.	301.	260.	313.	292.	324.	301.	308.	297.	322.	313.
7. Wyoming, All Commodities, Prices Received-Average	283.	273.	294.	280.	295.	300.	311.	308.	300.	304.	314.	315.
8. U.S. All Commodities, Prices Received-Latest	235.	232.	237.	253.	264.	265.	274.	270.	261.	270.	281.	277.
9. U.S., All Commodities, Prices Received-Average	234.	235.	238.	246.	263.	263.	275.	271.	264.	267.	278.	278.
10. Wyoming Livestock, Prices Received-Latest	327.	283.	325.	265.	310.	283.	316.	283.	308.	290.	318.	303.
11. Wyoming Livestock, Prices Received-Average	300.	289.	317.	294.	293.	293.	309.	292.	292.	300.	315.	306.
12. U.S. Livestock, Prices Received-Latest	201.	248.	260.	257.	268.	269.	281.	264.	276.	296.	302.	250.
13. U.S. Livestock, Prices Received-Average	241.	252.	259.	259.	264.	267.	284.	269.	276.	287.	293.	282.
14. Prices Paid by U.S. Farmers-Average	336.	335.	339.	348.	352.	354.	359.	361.	361.	365.	281.	372.

¹First time readers of WOU should refer to the "Format" page (in back) for an explanation of abbreviations and table formats.

²The index for the last month (latest) of each quarter, along with the average of the three monthly indices of each quarter.

Sources: Series 1: United States Forest Service. "Timber Cut and Sold, Convertible Products." Region 2 and 4 reports published quarterly.
Series 2-15: Wyoming Crop and Livestock Reporting Service. Bi-weekly Ag Statistics.

Table 2: Banking and Finance

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Total Bank Loans and Leases Financing Receivables (T\$)	1779168.	1765203.	1733754.	1787542.	1777474.	1758410.	1740029.	1793438.	1787592.	1782338.	1848557.	INA
2. Total Bank Deposits (T\$)	3688191.	3792473.	3671572.	3705311.	3712403.	3753325.	3623495.	3621158.	3633097.	3838374.	3768344.	INA
3. Total Non-Interest- Bearing Deposits (T\$)	582741.	603809.	531243.	564608.	572367.	577610.	525702.	549281.	559276.	648397.	542168.	INA
4. Savings and Loan Mortgage Loans (T\$) ¹	794162.	772721.	744492.	740954.	726300.	711602.	719240.	696415.	617166.	636718.	INA	INA
5. Savings and Loan Deposits (T\$)	1104332.	1137196.	1119558.	1107268.	1107961.	1070072.	1032814.	988180.	952120.	967446.	632892.	INA
6. Prime Interest Rate ²	8.70	8.75	8.50	9.00	10.00	10.50	11.50	11.07	10.50	10.50	10.0	10.0

¹Only members of the Federal Home Loan Bank Board are included. Indicates amount at the end of the quarter.
²Prime rate charged by banks on short-term business loans. Rate is for last month of the quarter.

Sources: Series 1-3: Office of the State Examiner of Wyoming, Abstract Report of State and National Banks in Wyoming, Published Quarterly.
Series 4 and 5: Federal Home Loan Bank of Seattle, Monthly Report. Comparative statistical analysis of member institutions.
Series 6: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 3: Business Conditions

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. New Domestic Corporations	267.	254.	300.	298.	246.	221.	284.	302.	236.	276.	316.	355.
2. New Foreign Corporations	259.	229.	208.	196.	208.	232.	210.	249.	196.	208.	196.	262.
3. Total New Corporations	526.	483.	508.	494.	454.	453.	484.	551.	432.	484.	512.	617.
4. Business Failures	56.	53.	75.	52.	34.	32.	31.	30.	24.	25.	31.	28.
5. Value of Business Failures (\$)	5918282.	14181020.	11499022.	3906790.	28339514.	36551338.	3120102.	7852143.	3591064.	1998791.	2914000.	5578685.
6. Personal Bankruptcies	301.	308.	271.	351.	306.	306.	274.	336.	287.	285.	237.	362.

Sources: Series 1-3: Secretary of State. New and Foreign Corporations. Monthly report.

Series 4-6: Cheyenne Credit Bureau. Wyoming bankruptcy cases, business failures, and value of failures. Weekly publication.

Table 4: Construction

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. New Residential Dwelling Units	744.	297.	304.	449.	359.	291.	233.	289.	401.	264.	394.	317.
2. Value of Residential Dwellings Constructed (M\$)	59.4	34.3	23.5	37.3	31.3	22.6	18.2	25.0	34.7	23.8	34.7	31.3
3. Value of Nonresidential Construction (M\$)	23.0	18.2	4.2	35.2	6.9	10.2	10.9	19.7	23.3	20.7	15.5	22.7
4. Building Permits Issued in Selected Wyoming Cities	3953.	2451.	1489.	2763.	2220.	2082.	1578.	2806.	2663.	1996.	1695.	2634.
5. Value of Authorized Construction (1\$)	24258.	13633.	15559.	25330.	21878.	18071.	8866.	24528.	22760.	27343.	16011.	37542.
6. Mortgage Interest Rate ¹	9.03	8.78	8.77	8.72	8.90	9.03	9.66	10.09	9.87	9.70	9.70	9.8

¹Conventional first mortgage for new home purchase. U. S. average for last month of quarter.

Sources: Series 1-3: F.W. Dodge Division of McGraw-Hill. "Dodge Local Construction Potentials." Published monthly.

Series 4-5: Survey Research Center. "Local Construction Reports." Survey of authorized construction in selected cities conducted monthly.

Series 6: U. S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Table 5: Consumers

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. New Truck Registrations	3011.	3301.	2867.	3508.	3203.	3227.	3086.	3734.	3775.	3344.	3474.	3697.
2. New Car Registrations	3332.	3027.	2736.	3147.	2969.	2849.	2538.	3341.	3412.	2409.	2352.	2607.
3. Wyoming Personal Income (M\$)	6286.	6409.	6409.	6617.	6537.	6587.	6592.	6666.	6688.	6882.	6967.	INA
4. U.S. Disposable Income (B\$)	3225.	3316.	3376.	3422.	3512.	3587.	3690.	3748.	3807.	3871.	3888.	3930.
5. U.S. Personal Income (M\$)	3777771.	3904535.	3940516.	4022113.	4083999.	4166501.	4258945.	4331901.	4381863.	4470967.	4548951.	INA
6. Latest U.S. Consumer Price Index (1982-1984=100) ¹	113.8	114.2	115.1	116.7	118.5	119.2	120.8	122.8	123.6	124.6	127.1	127.5
7. Quarter's Average U.S. CPI	113.3	114.2	114.8	116.7	117.8	119.5	120.2	122.4	123.3	124.4	127.5	127.7
8. Liquor Sales (T\$)	7616.	8379.	5679.	6714.	7041.	8368.	5530.	6747.	7269.	7746.	5729.	7036.

¹Number shown is for the last month of the quarter. CPI shown is the index for wage earners and clerical workers.

²Beginning January 1987, the consumer price index, previously expressed on a base of 1967=100, has been rebased to 1982-84=100. Selection of the 1982-84 period was made to coincide with the updated expenditure weights, which are based upon data tabulated from the Consumer Expenditure Surveys for 1982, 1983, and 1984. Historical data on the new base or additional information regarding these changes is available from the Bureau of Labor Statistics, Washington, D.C. 20212.

Sources: Series 1-2: R.L. Polk and Company Motor Statistical Division. "National New Vehicle Registration Service." Published monthly.

Series 3,4: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published quarterly.

Series 5,6,7: U.S. Department of Commerce, Bureau of Economic Analysis. Survey of Current Business. Published monthly.

Series 8: Wyoming Liquor Commission. Sales data are reported to SRC.

Table 6: Employment and Labor¹

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Civilian Labor Force	242054.	230684.	228734.	232589.	235250.	231426.	235106.	238973.	225475.	224793.	234724.	245354.
2. Employment	225635.	214312.	209923.	219454.	222072.	216552.	217688.	224543.	212137.	212196.	223852.	233190.
3. Unemployment	16419.	16371.	18811.	13135.	13178.	14874.	17418.	14431.	13338.	12597.	10871.	12164.
4. Unemployment rate	6.8	7.1	8.2	5.6	5.6	6.4	7.4	6.0	5.9	5.6	4.6	5.0
5. Initial Claims Filed	6386.	9983.	10949.	6888.	5376.	9704.	10334.	6508.	4773.	8659.	9220.	5673.
6. Miners' Average Weekly Hours	42.7	45.4	42.9	43.6	43.4	42.7	46.3	34.8	43.6	44.0	43.8	33.9
7. Miners' Average Weekly Pay (\$)	605.87	637.42	625.72	533.42	619.70	627.33	678.68	651.62	611.21	617.15	660.70	684.52
8. Miners' Average Hourly Wage (\$)	14.19	14.04	14.60	12.23	14.29	14.68	14.67	18.73	14.01	14.02	15.08	20.19

¹The most recent year's data are preliminary.

Sources: Series 1-11: Wyoming Employment Security Commission. Labor Force Trends. Published monthly.

Table 7: Energy and Mineral Production

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Wyoming Coal (TST)	39261.	38831.	37323.	39016.	42883.	41013.	41874.	40469.	41114.	41629.	45139.	INA
2. U.S. Coal (TST)	226784.	246314.	231473.	225968.	239046.	227754.	249267.	238251.	236713.	250209.	261688.	INA
3. Wyoming Oil (TBDP)	310.	317.	320.	317.	306.	299.	302.	301.	296.	295.	292.	289.
4. U.S. Oil (TBDP)	8227.	8347.	8304.	8216.	8033.	7984.	7753.	7827.	7669.	7607.	7459.	7275.
5. Wyoming Natural Gas (MHCFD) ¹	1171.	1203.	1430.	1339.	1135.	1455.	1953.	1274.	1340.	1820.	INA	INA
6. U.S. Natural Gas (MHCFD)	44335.	49241.	50768.	46453.	44547.	48982.	48936.	46397.	44527.	47876.	50073.	INA
7. Active Rig Counts in Wyoming-Average	47.	61.	40.	33.	43.	31.	20.	22.	43.	50.	34.	31.

¹Beginning with fourth quarter 1986, Wyoming gas includes carbon dioxide production.

Sources: Series 1,2,5, and 6: U. S. Department of Energy. Energy Data Reports. Gas data are from Natural Gas Monthly, and the Wyoming Oil and Gas Conservation Commission. Coal data are published weekly.

Series 3-4: The Oil and Gas Journal. U.S. and Wyoming Oil Production. Published weekly.

Series 7: Petroleum Information Corporation, Hughes Tool Company. Monthly Average Active Rig Counts in Wyoming.

Table 8: Government

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Sales and Use Tax Collections (\$)	44922.	47115.	42585.	42769.	49721.	46445.	41823.	42966.	53145.	54618.	51699.	50077.
2. Violent Crime ¹	435.	354.	354.	371.	431.	308.	310.	278.	323.	307.	301.	INA
3. Nonviolent Crime ²	5057.	4420.	3713.	4562.	4662.	3917.	3565.	4423.	4704.	4138.	3800.	INA
4. Stolen Property (\$)	2494.	2199.	1770.	1986.	2467.	2272.	2040.	2617.	2200.	1894.	2151.	INA
5. Stolen Property Recovery Rate	33.1	34.1	42.2	43.1	35.5	36.0	42.8	30.5	44.0	36.7	46.3	INA
6. Percent of Crimes Cleared ³	44.2	34.5	33.7	28.3	30.9	40.0	33.0	27.5	27.1	29.5	35.2	INA

¹Murder, negligent homicide, forcible rape, robbery, aggravated assault.

²Burglary, larceny, auto theft.

³Clearance of a crime indicates resolution of a complaint by arrest or other extraordinary means.

Sources: Series 1: Wyoming Department of Revenue and Taxation, Sales and Use Tax Division. "Net Collections by Business Class by County."

Series 2-6: Uniform Crime Reporting Center for Criminal Justice Research, Division of Criminal Identification, Office of the State Attorney General. "Crime in Wyoming." Published quarterly.

Table 9: Tourism

Calendar Quarter	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
<u>Visitors, National Parks and Monuments</u>												
1. Yellowstone	1692818.	168613.	83736.	649842.	1268270.	216076.	82542.	720021.	1724290.	153523.	79552.	761664.
2. Grand Teton	1486479.	264932.	144982.	624400.	1083754.	223562.	211180.	665734.	1361210.	302539.	170799.	680593.
3. Devil's Tower	215299.	17980.	7121.	109993.	222877.	20702.	8064.	120589.	229668.	19106.	8251.	119264.
4. Fossil Butte	13793.	1072.	286.	5894.	13838.	1195.	224.	5565.	13192.	1452.	195.	6692.
5. Fort Laramie	50167.	4437.	1172.	24384.	49631.	4145.	1475.	20488.	40697.	3007.	1505.	21869.
6. Big Horn NRA-South ¹	70305.	40782.	30045.	60727.	58820.	35558.	14293.	47417.	62160.	185172.	15664.	102821.
<u>Other Tourism Indicators</u>												
7. Traffic count (Avg. number of Vehicles/Day)	163546.	113385.	88529.	142830.	178675.	118023.	113409.	146663.	184209.	118130.	105793.	159830.
8. Hotel, Motel, and Camp Sales Tax (T\$)	1821.	1871.	947.	1050.	2106.	1929.	950.	1013.	1962.	1951.	991.	1135.
9. Gasoline Sales (TGL)	98146.	71190.	62295.	81811.	96106.	70784.	61807.	78869.	INA	INA	INA	INA

¹Big Horn Canyon N.R.A. is only partially in Wyoming. Only visitation for the Wyoming part is shown.

Sources: Series 1-6: Monthly visitor use reports of the National Park Service.

Series 7: Traffic Survey Unit - Planning Branch, Wyoming State Highway Department. "Selected Recording Stations Traffic Counter Data." Published monthly.

Series 8: Wyoming Department of Revenue and Taxation. "Sales and Use Tax Summary by County by SIC Major and Minor." Reported monthly.

Series 9: Petroleum Association of Wyoming. Monthly Gasoline Gallonage Report.

Table 10: Utilities

Calendar Quarters	3/87	4/87	1/88	2/88	3/88	4/88	1/89	2/89	3/89	4/89	1/90	2/90
1. Residential Electric Connections	175745.	175879.	175896.	176333.	177122.	176457.	175841.	175589.	175485.	176197.	174439.	179163.
2. Residential Electric Consumption (TKWH)	291941.	399068.	505669.	351036.	301098.	401776.	688891.	348577.	296588.	418463.	488454.	351960.
3. Commercial Electric Connections	33898.	33780.	33602.	33722.	33846.	33756.	33928.	33997.	34038.	140722.	34036.	34278.
4. Commercial Electric Consumption (TKWH)	419465.	416675.	456190.	420630.	425495.	426766.	67697.	414902.	428705.	449339.	457875.	447084.
5. Industrial Electric Connections	2796.	2764.	2760.	2748.	2921.	2872.	2972.	3104.	3143.	3084.	3203.	3507.
6. Industrial Electric Consumption (TKWH)	1740306.	1819191.	1788103.	1815370.	1720051.	1847617.	1812799.	1923513.	1790624.	1968557.	1990072.	1919833.
7. Other Connections ²	3195.	2680.	2965.	3690.	3899.	3404.	3349.	7440.	4573.	4091.	4675.	4198.
8. Other Consumption (TKWH)	84447.	16355.	10451.	24283.	64994.	13221.	9051.	41364.	102572.	59012.	57166.	57187.
9. Residential Natural Gas Connections	73512.	72654.	74286.	73935.	90673. ³	93300.	100074.	99535.	97665.	90066.	90456.	90223.
10. Residential Natural Gas Consumption (MCF)	740699.	2274494.	4310738.	2042533.	826220. ³	2521850.	5786697.	2436947.	871763.	2454142.	4537105.	2321660.
11. Commercial Natural Gas Connections	6546.	6520.	6643.	6560.	8357. ³	9398.	9422.	9289.	10514.	18913.	19028.	18910.
12. Commercial Natural Gas Consumption (MCF)	408459.	997247.	1939461.	957241.	475106. ³	1349515.	2981071.	1283967.	631348.	1818451.	3305106.	1702262.
13. Industrial Natural Gas Connections	88.	87.	88.	90.	90.	78.	85.	82.	80.	79.	73.	73.
14. Industrial Natural Gas Consumption (MCF)	508551.	828532.	3249154.	482088.	2324709.	2504087.	3069267.	1977830.	2279086.	2611580.	3019329.	2774710.
15. Other Natural Gas Connections	38.	35.	39.	36.	35.	34.	36.	36.	34.	33.	29.	32.
16. Other Natural Gas Consumption (MCF)	7352.	6988.	12922.	1920.	7488.	232.	1216.	4344.	10405.	312.	138.	2309.

¹Some small utilities do not report, hence the data are slightly less than actual state totals. The data are consistent. The same utilities' reports are included in each figure.

²"Other" includes agriculture, municipal, and other public.

³Starting with third quarter, 1988, the figures for Residential and Commercial Natural Gas Connections and Residential and Commercial Natural Gas Consumption reflect the merger of Northern Gas Division, Northern Utilities Division, and Northern Mountain Gas Company now doing business as Northern Gas of Wyoming.

FORMAT

For data available at least quarterly, the last 12 quarters are printed in **WQU**. In this edition, published series begin with the 3rd quarter of 1987, and end with the 2nd quarter of 1990. For other data series (primarily annual), the most recent observations, up to 12, are published in **WQU**. Quarters are calendar quarters. For example, the 4th quarter is composed of October, November and December. In the table headings and narratives, a particular quarter will be indicated by notation such as 3/87 (3rd quarter, 1987), 4/87 (4th quarter, 1987), and so on.

Beside each data series name is an abbreviation in parenthesis. The abbreviation indicates the units (such as dollars, tons, feet, miles, etc.) of the data. The key to the units abbreviations is below.

Throughout **WQU**, all data are for the State unless otherwise stated. The most recent year's data should be viewed as preliminary, due to revisions. The acronym "INA" signifies that information is not available.

The reader should be attentive to the footnotes at the bottom of pages, particularly those accompanying a data table. The footnotes help the reader to properly interpret the data, and they also indicate when more detailed (by subject or by area) data than that which is shown is available from SRC. A list of sources follows the footnotes.

Key to Units Abbreviations

MBF	-	Thousand Board feet	CWT	-	Hundred Weight
KWH	-	Kilowatt Hours	ST	-	Short Tons
TKWH	-	Thousand Kilowatt Hours	HST	-	Hundreds of Short Tons
\$	-	Dollars	TST	-	Thousands of Short Tons
H\$	-	Hundreds of Dollars	\$/ST	-	Dollars Per Short Tons
T\$	-	Thousands of Dollars	HBBL	-	Hundreds of Barrels
M\$	-	Millions of Dollars	TBPD	-	Thousands of Barrels Per Day
B\$	-	Billions of Dollars	MCF	-	Thousand of Cubic Feet
GL	-	Gallons	HMCF	-	Hundreds of MCF Per Day
TGL	-	Thousands of Gallons	MMCFD	-	Million Cubic Feet Per Day

Feature Articles

--Blueprint For Business:

A Strategic Plan for Wyoming
Blueprint for Business Committee
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--Comments On Blueprint For Business

Dave Freudenthal
Attorney at Law

Rob Hurless

Editor, Casper Star Tribune

--A Conservationist's Review of the 1990

Blueprint For Business

John Zelazny
Conservation Programs Director
Wyoming Wildlife Federation

The Survey Research Center

The Survey Research Center was established in the Summer of 1989. In addition to maintaining the data base used to publish the Update, the Center has the facilities, equipment, personnel and expertise to collect, compute and analyze survey data for both the public and private sector. The Center also serves as the Campus Affiliate Center of the State Data Center in Cheyenne and has information from the United States Census Bureau available.

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